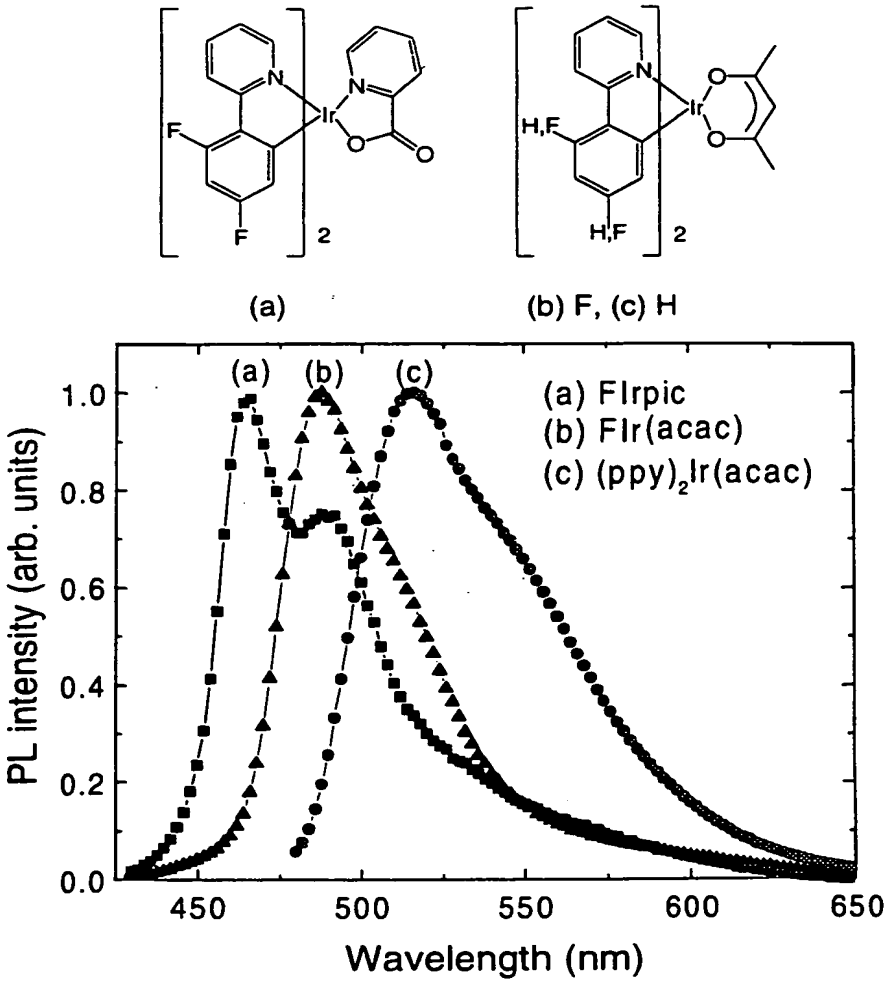


Figure 1a: C. Adachi, et. al.

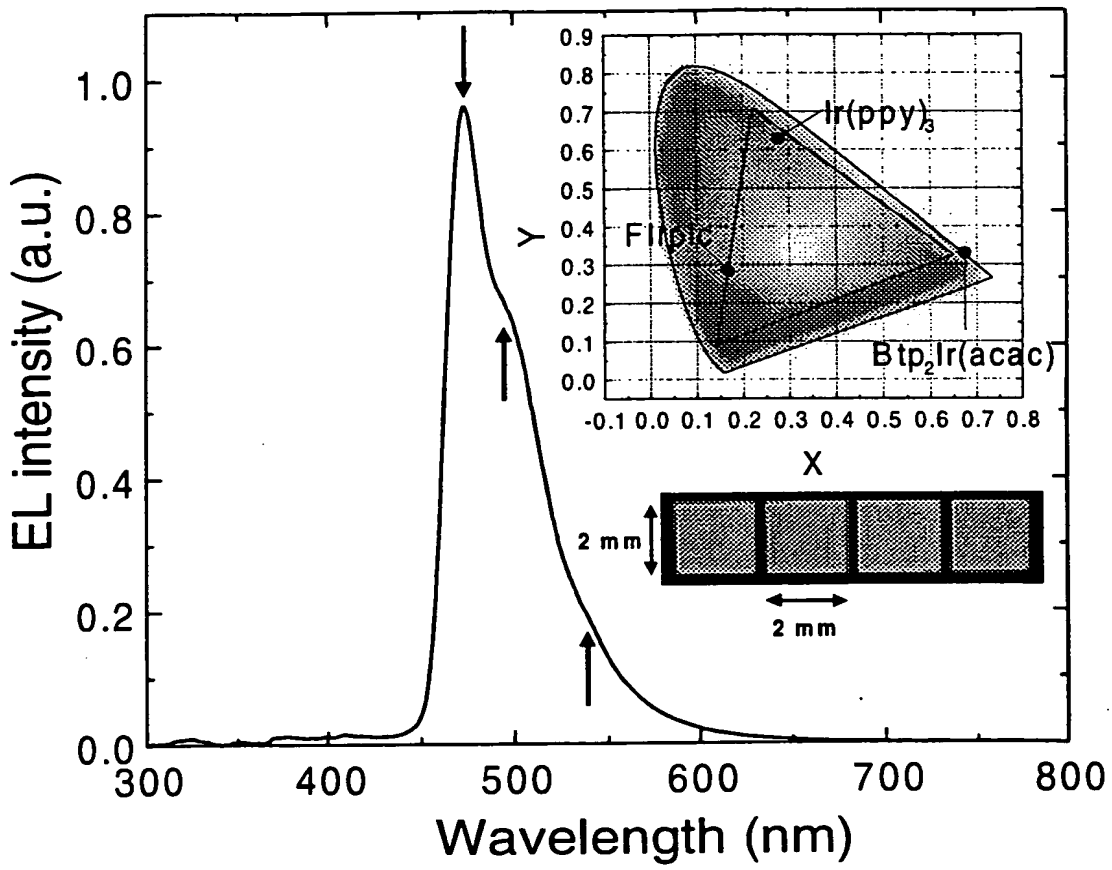


Figure 1b: C. Adachi, et. al.

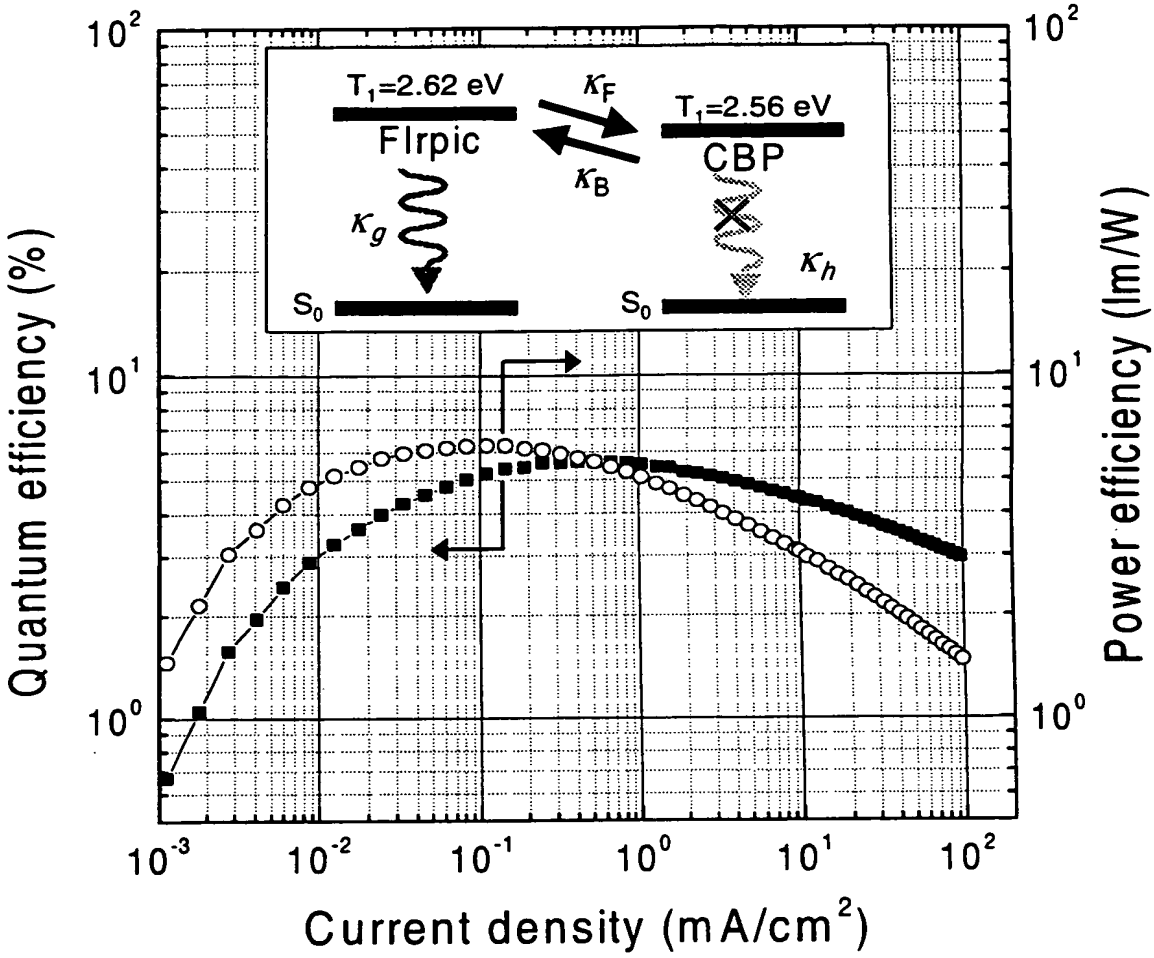


Figure 2: C. Adachi, et.al.

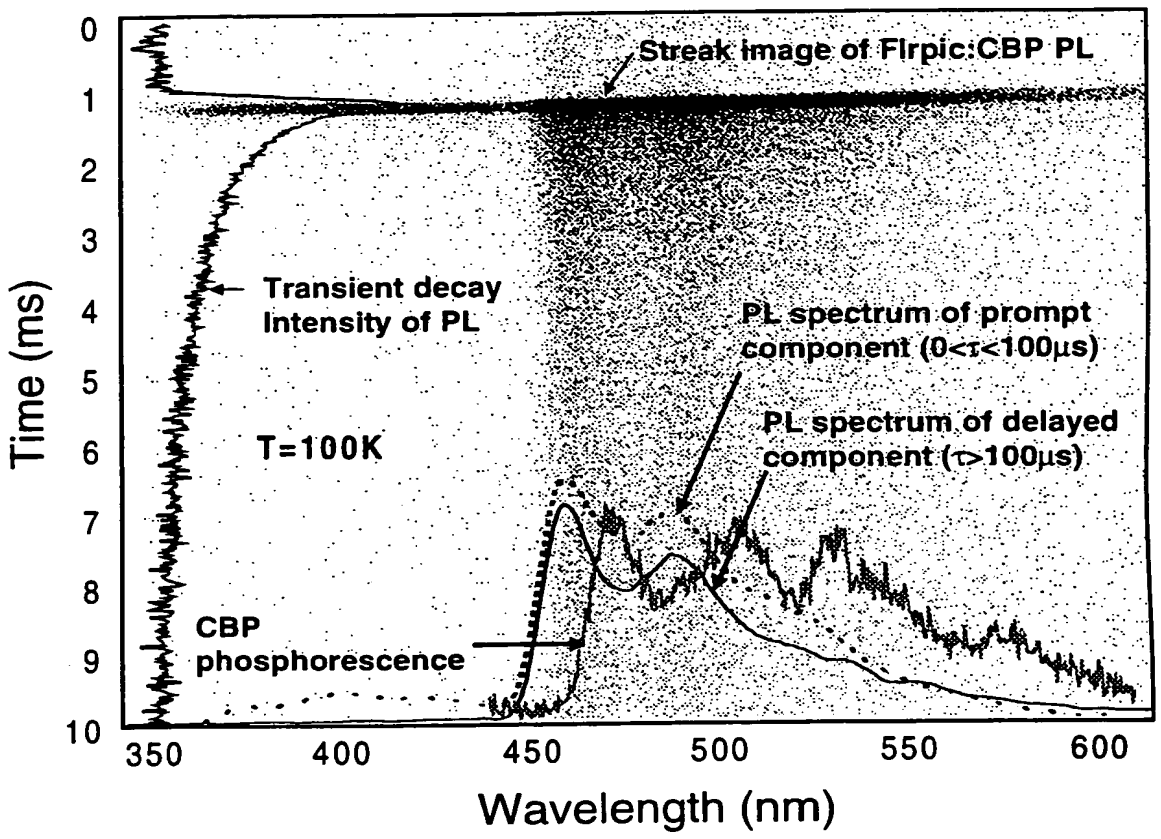


Figure 3: C. Adachi, et. al.

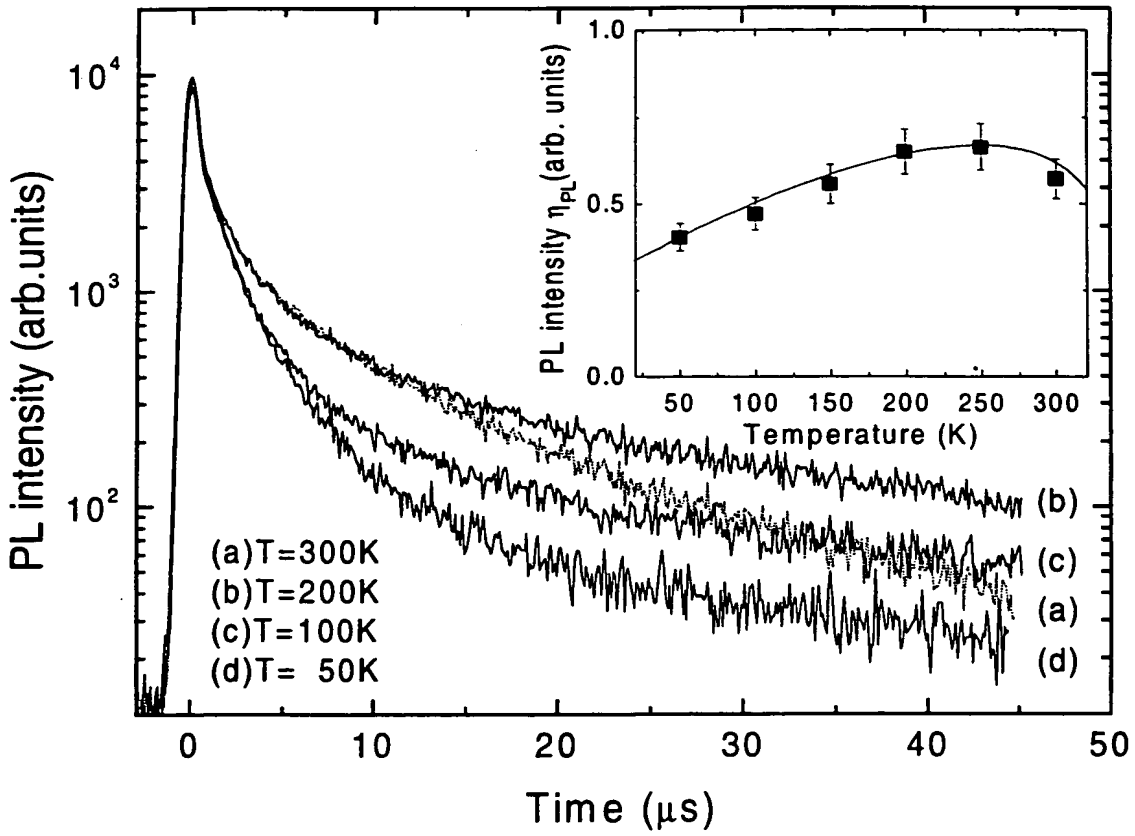
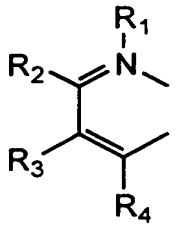
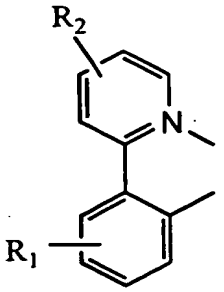


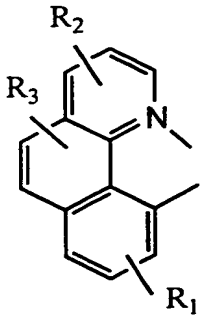
Figure 4: C. Adachi, et.al.

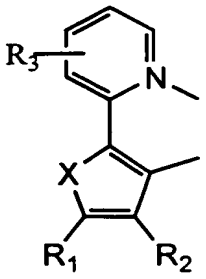
Figure 5a

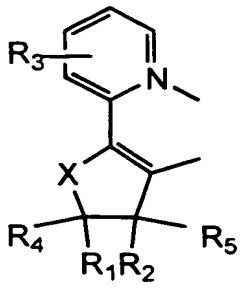
Generic Mono-Anionic, Bidentate, Carbon-Coordination Ligands-I

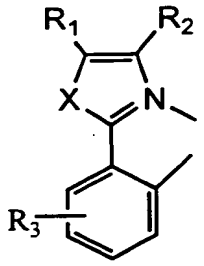


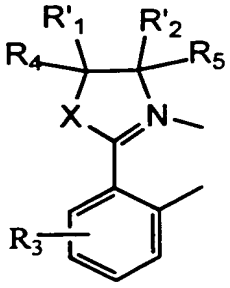


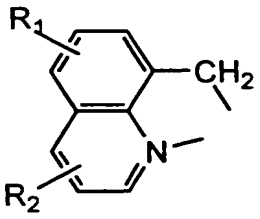








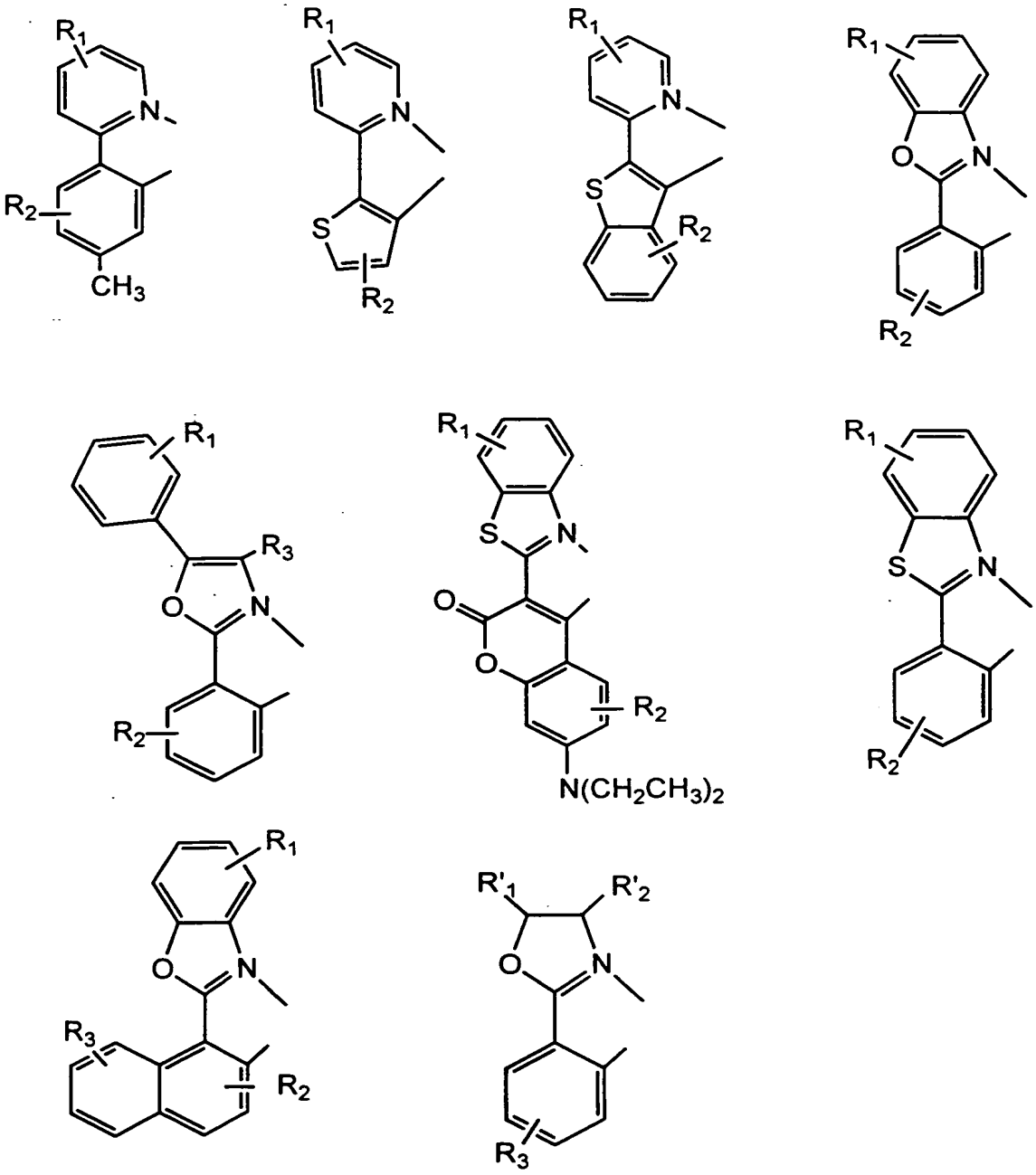




X = S, O, NR; and R_1, R_2, R_3, R_4 and R_5 are, independently, hydrogen, halogen, alkyl, aryl or arylene; and R'_1 and R'_2 may, in combination, be aryl.

Figure 5b

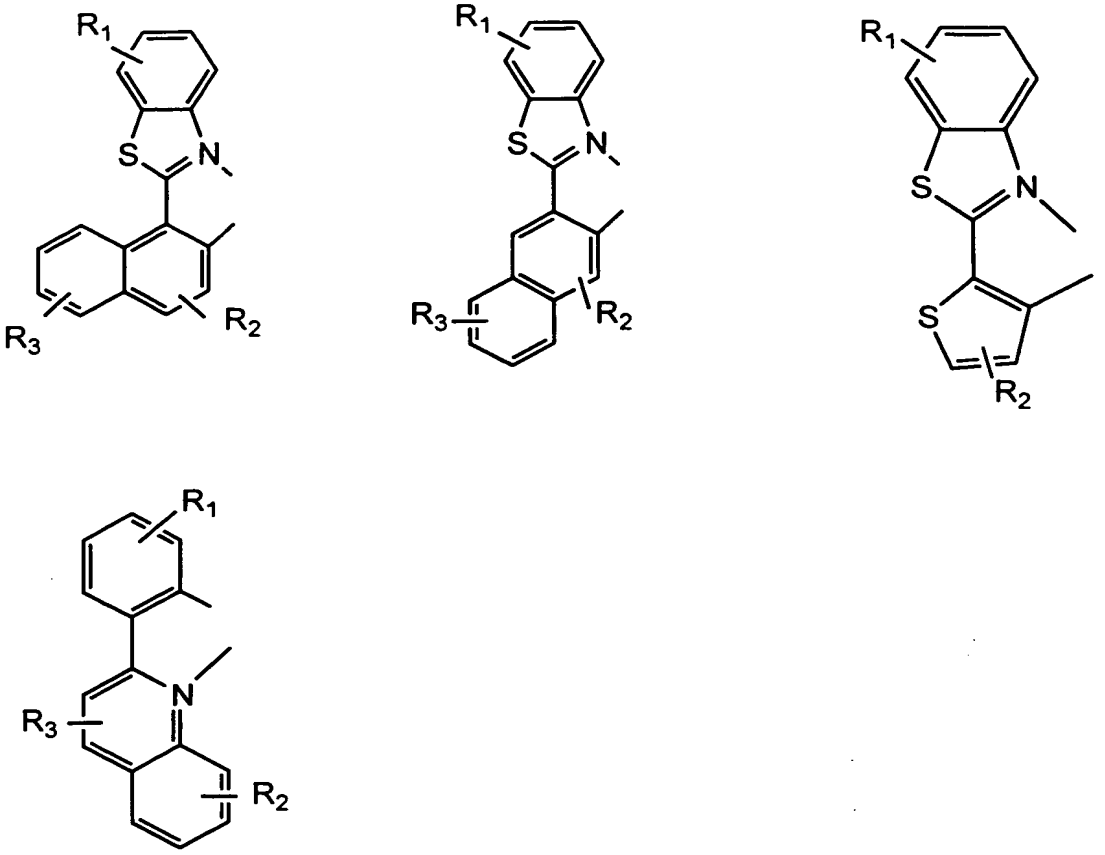
Generic Mono-Anionic, Bidentate, Carbon-Coordination Ligands-II



X = S, O, NR; and R_1, R_2, R_3, R_4 and R_5 are, independently, hydrogen, halogen, alkyl, aryl or arylene; and R'_1 and R'_2 may, in combination, be aryl.

Figure 5c

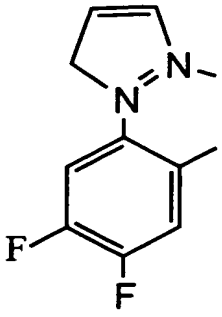
Generic Mono-Anionic, Bidentate, Carbon-Coordination Ligands-III

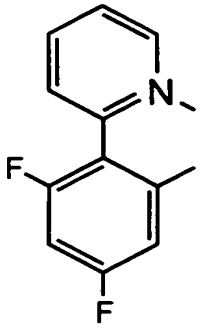


X = S, O, NR; and R_1, R_2, R_3, R_4 and R_5 are, independently, hydrogen, halogen, alkyl, aryl or arylene.

Figure 5d

Specific Mono-Anionic, Bidentate, Carbon-Coordination Ligands-I





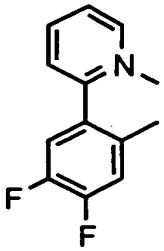
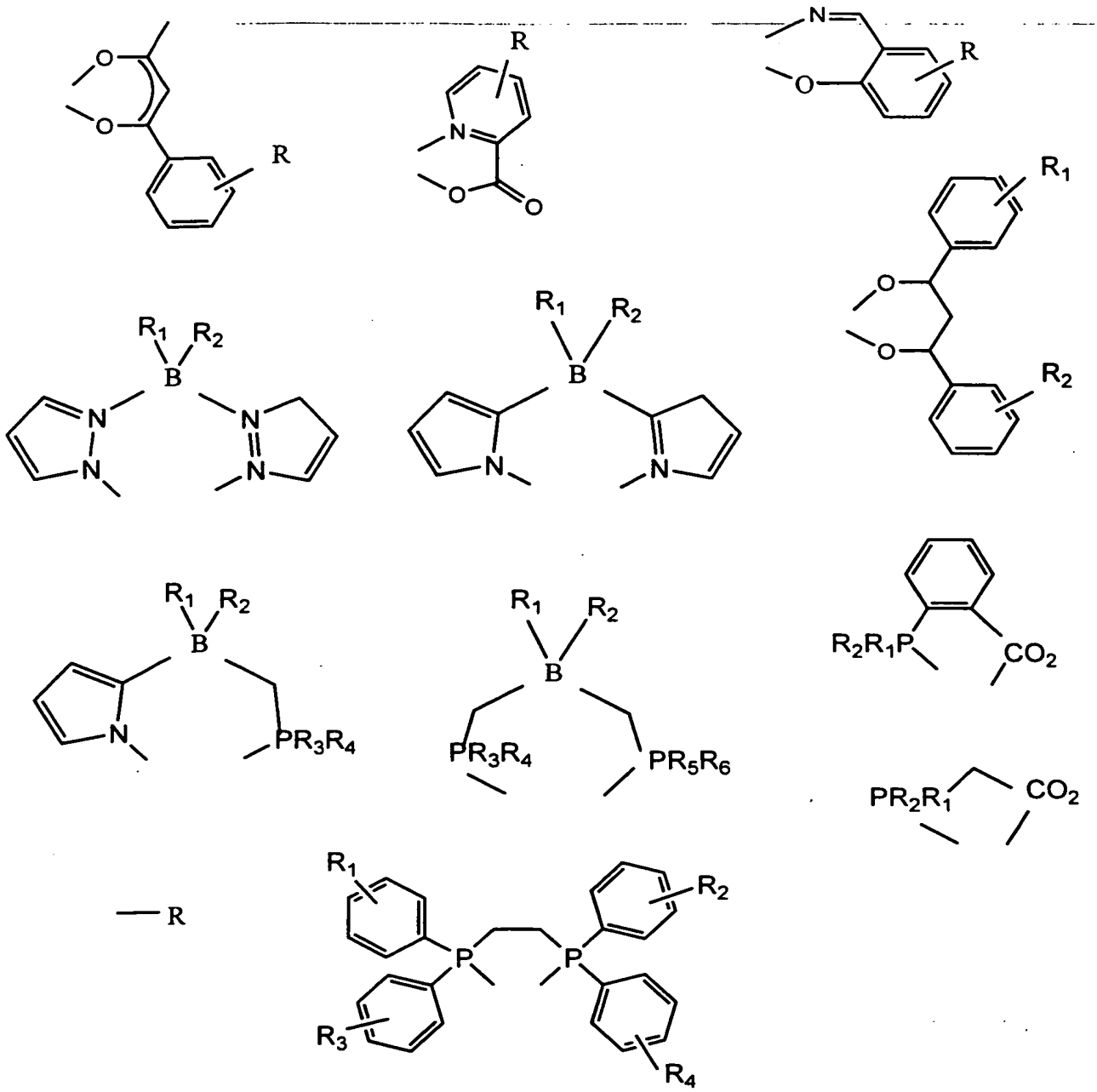


Figure 6a

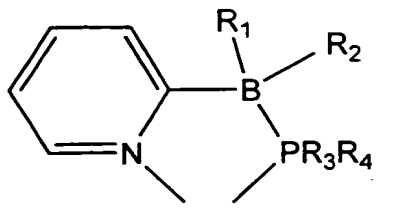
Generic Non-Mono-Anionic, Bidentate, Carbon-Coordination Ligands-I

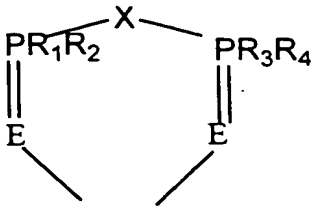


R, R_1, R_2, R_3, R_4, R_5, and R_6 are, independently, hydrogen, halogen, alkyl or aryl.

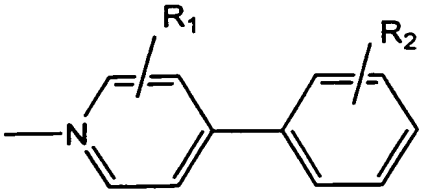
Figure 6b

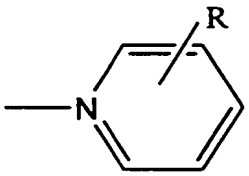
Generic Non-Mono-Anionic, Bidentate, Carbon-Coordination Ligands-II

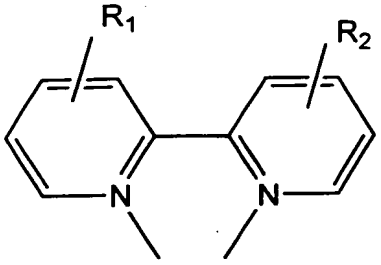


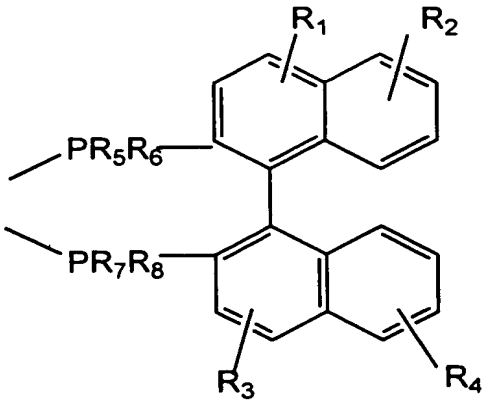


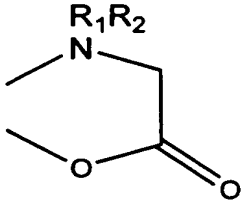
X = CH, N and
E = O, S, Se, Te

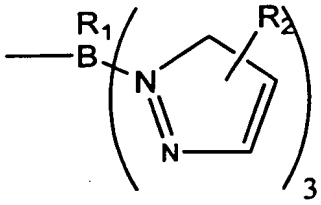


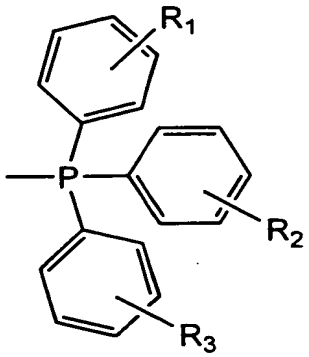












R, R_1, R_2, R_3, R_4, R_5, R_6, R_7 and R_8 are, independently, hydrogen, halogen, alkyl or aryl.

Figure 6c

Specific Non-Mono-Anionic, Bidentate, Carbon-Coordination Ligands

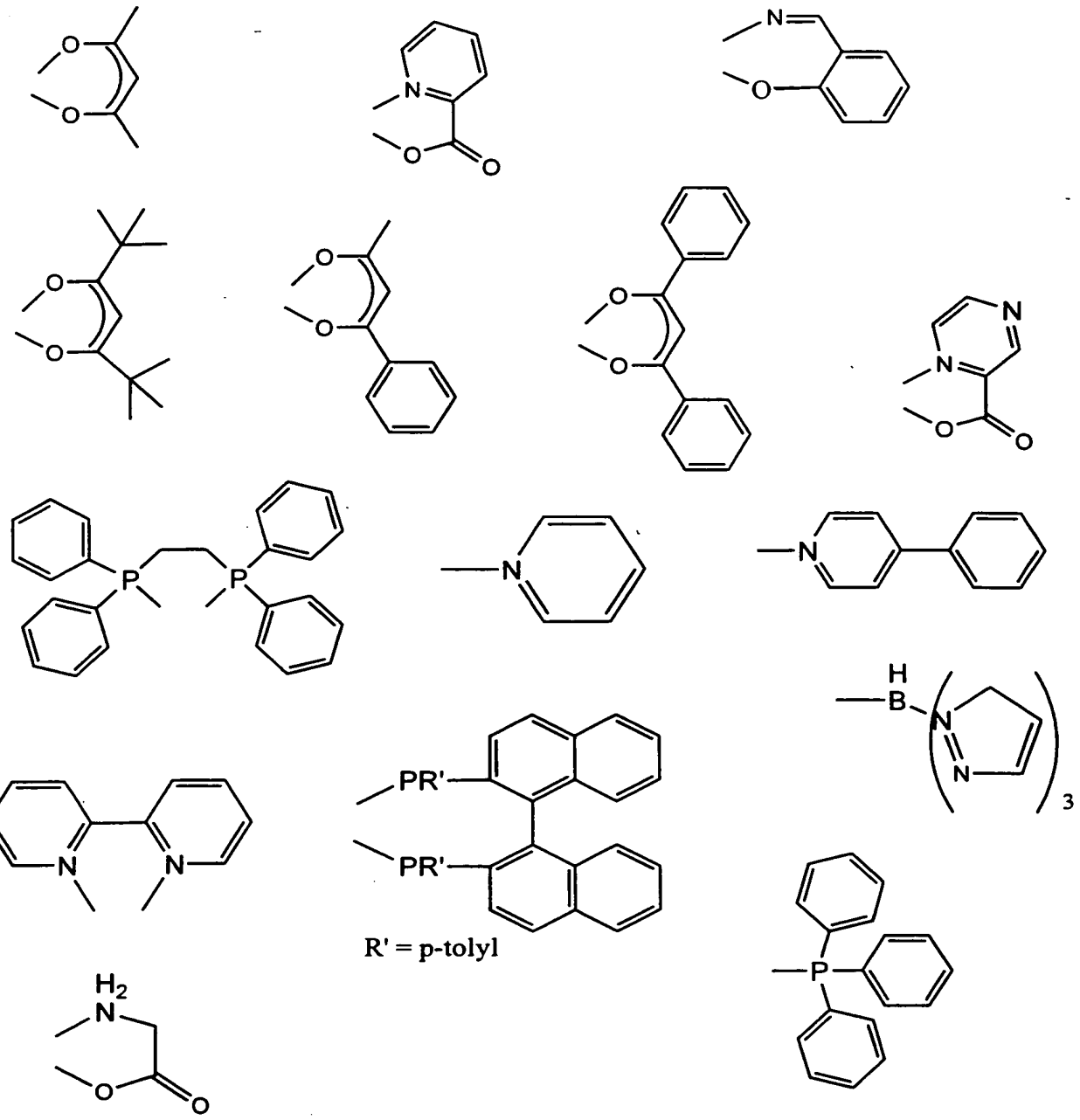


Figure 7a

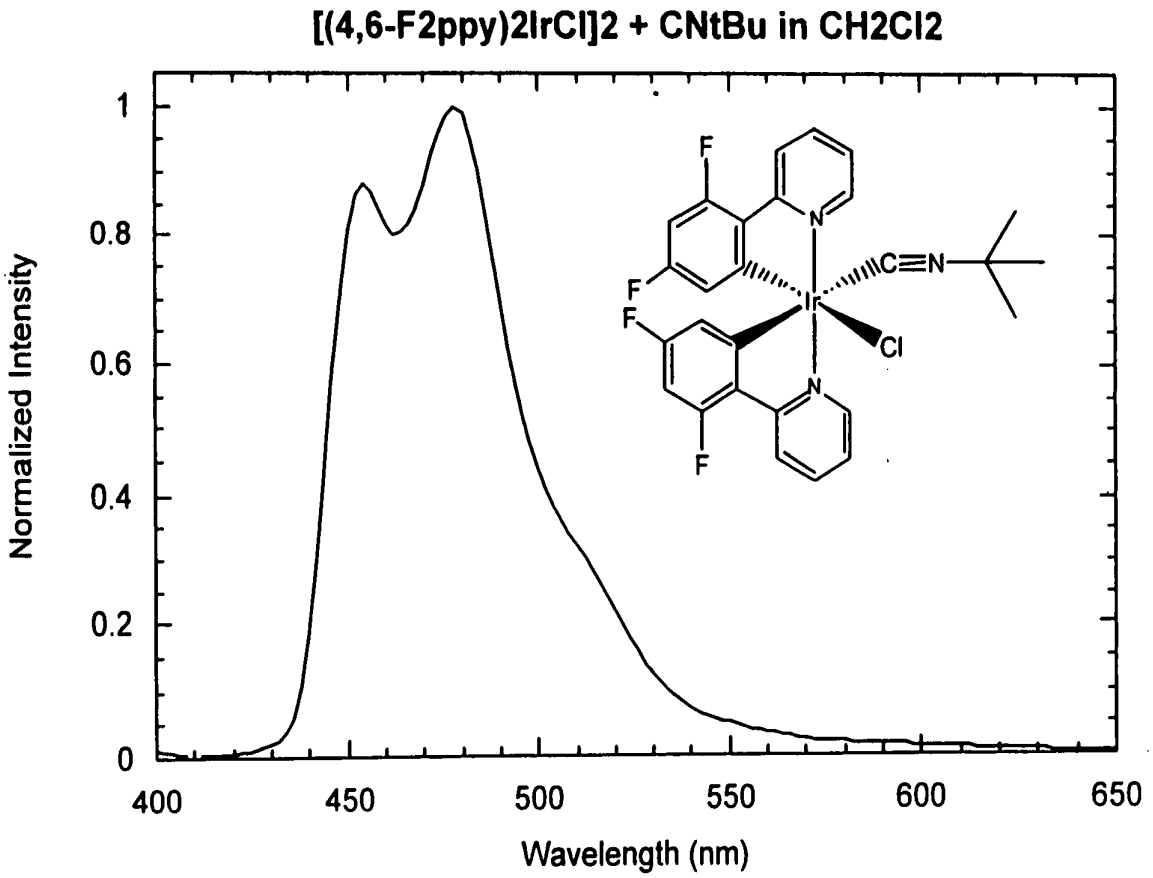


Figure 7b

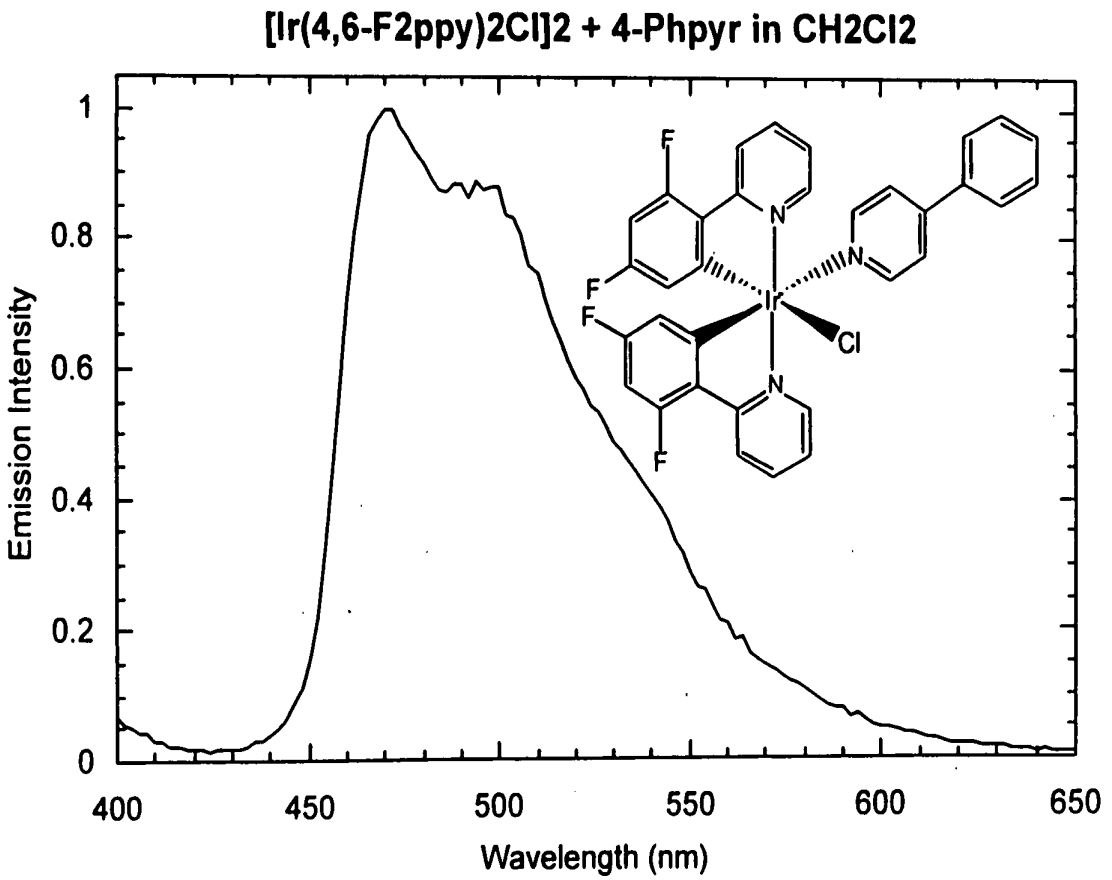


Figure 7c

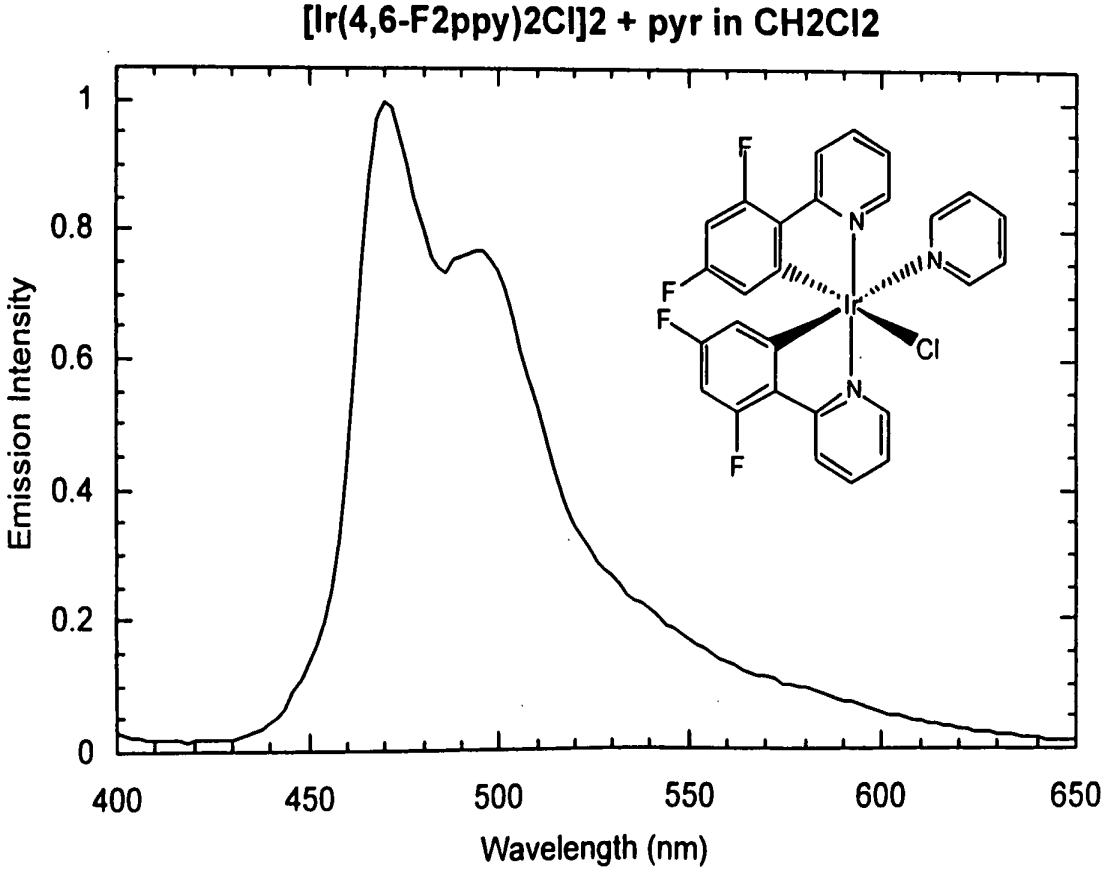


Figure 7d

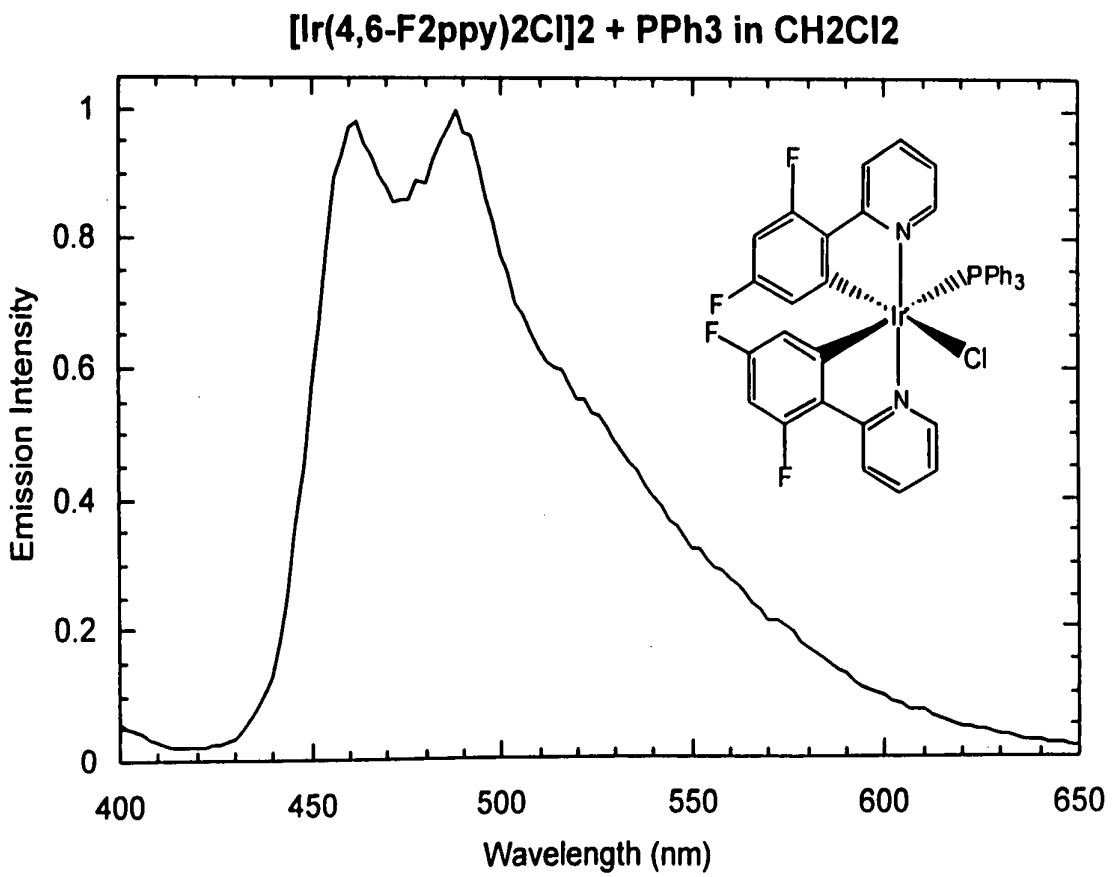


Figure 7e

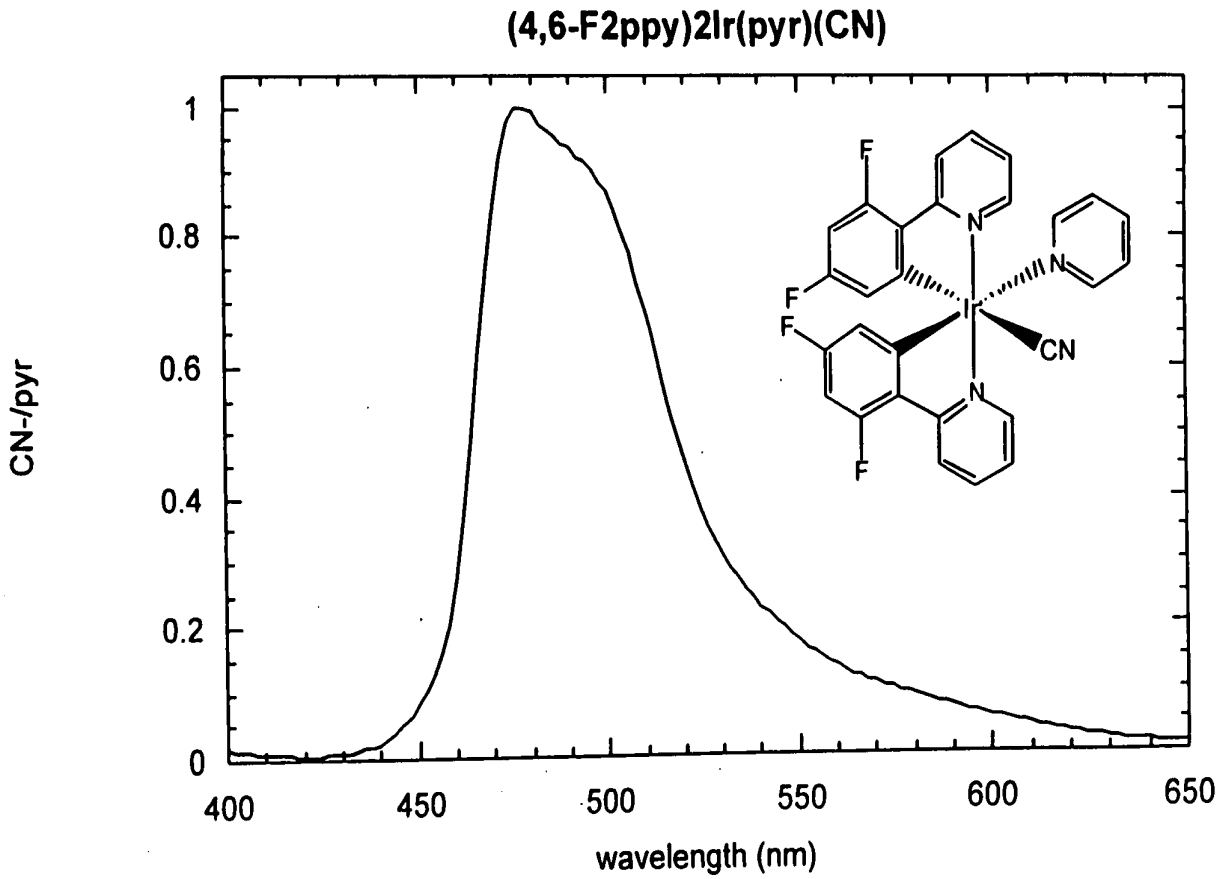


Figure 7f

(4,6-F2ppy)2Ir(PPh3)(CN)

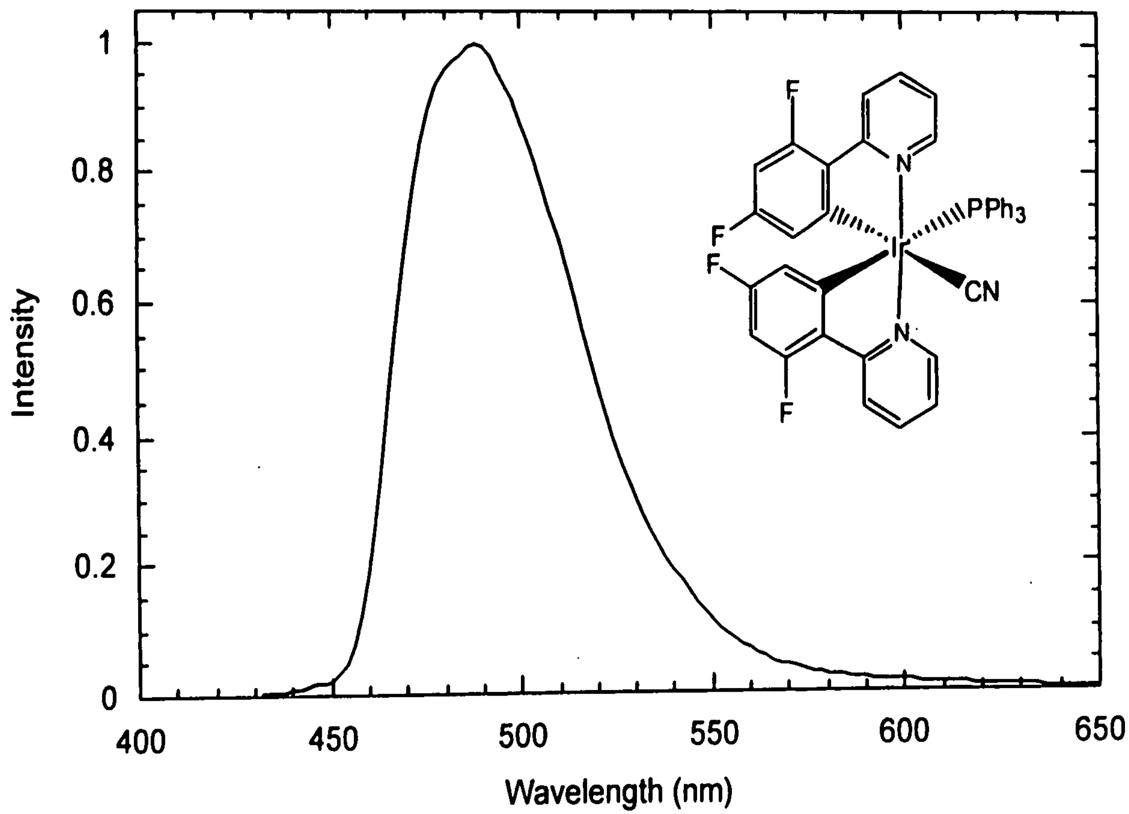


Figure 7g

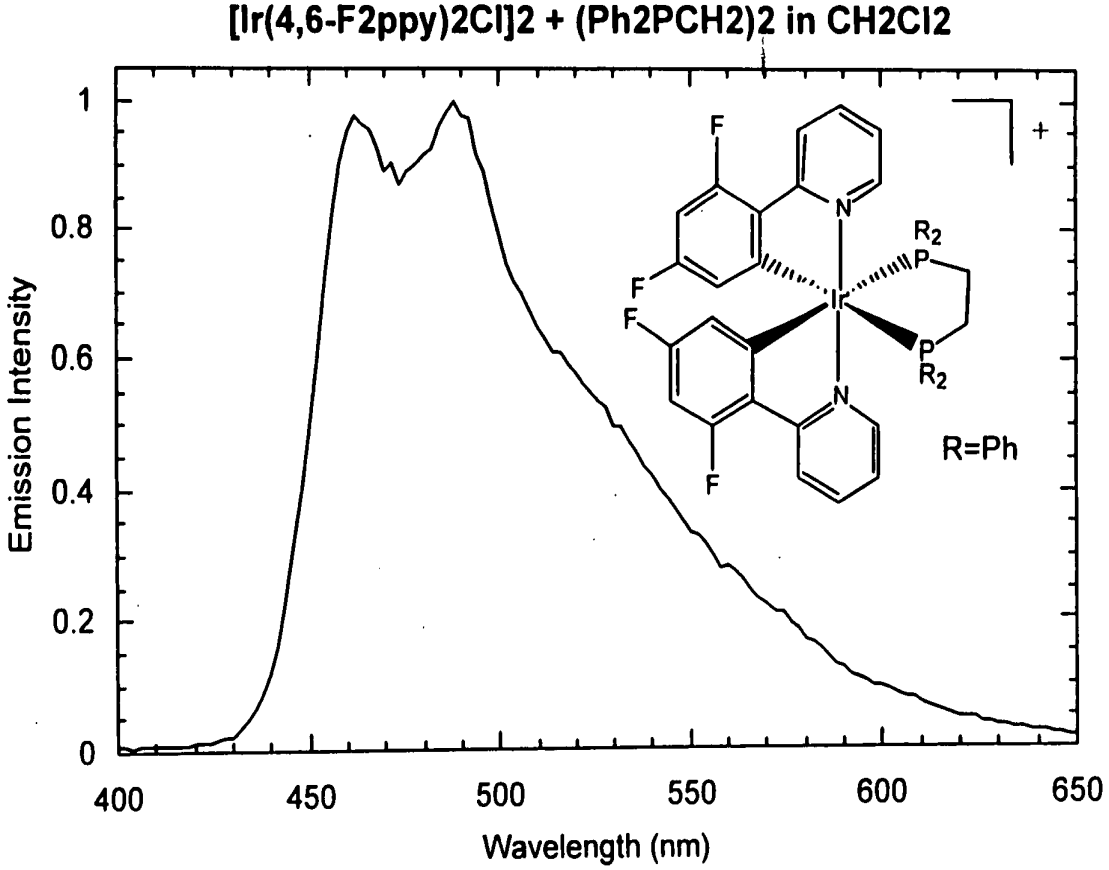


Figure 7h

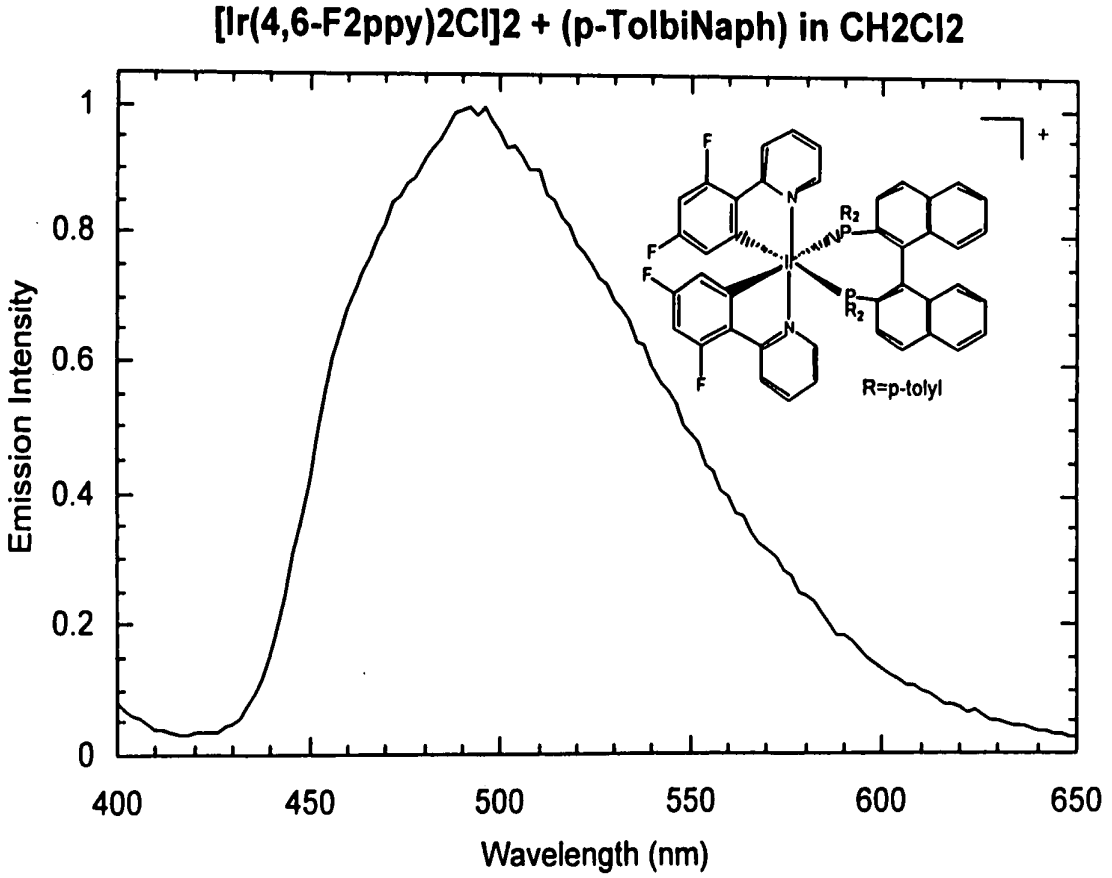


Figure 7i

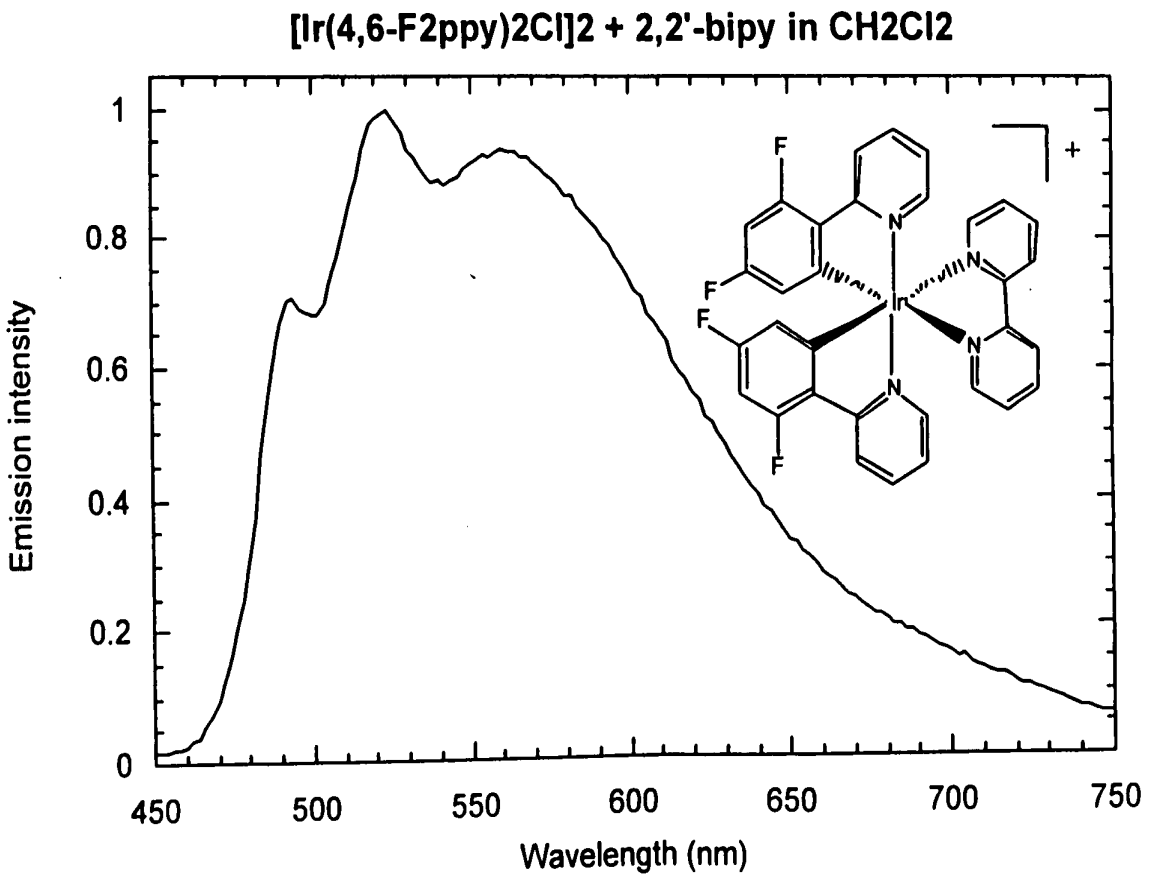


Figure 7j

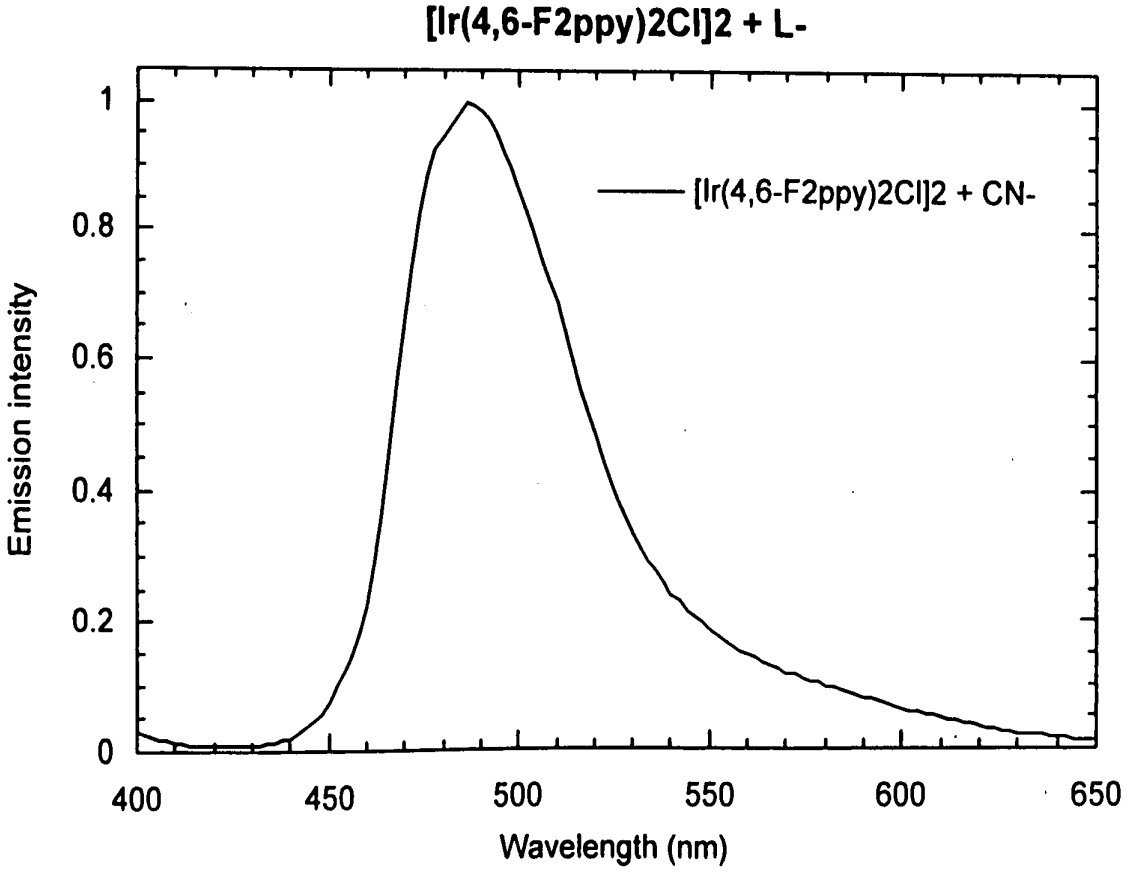


Figure 7k

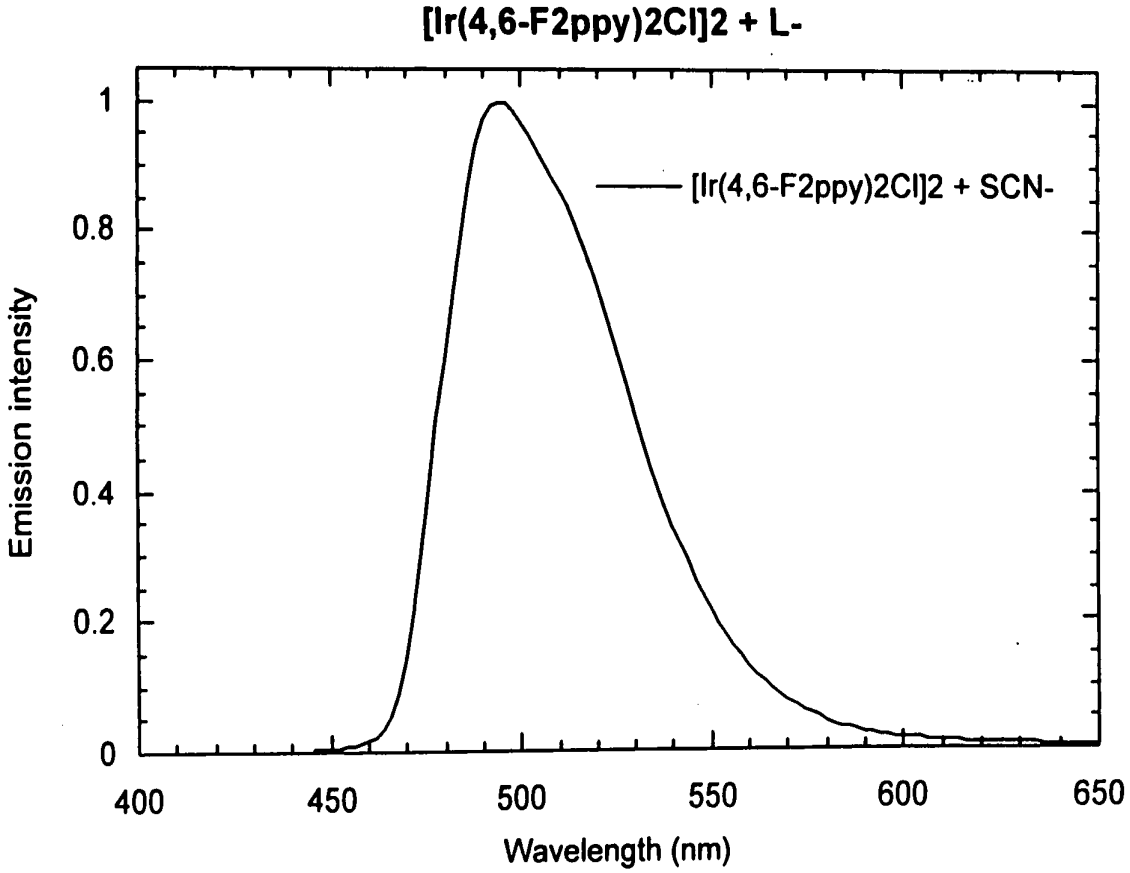


Figure 7l

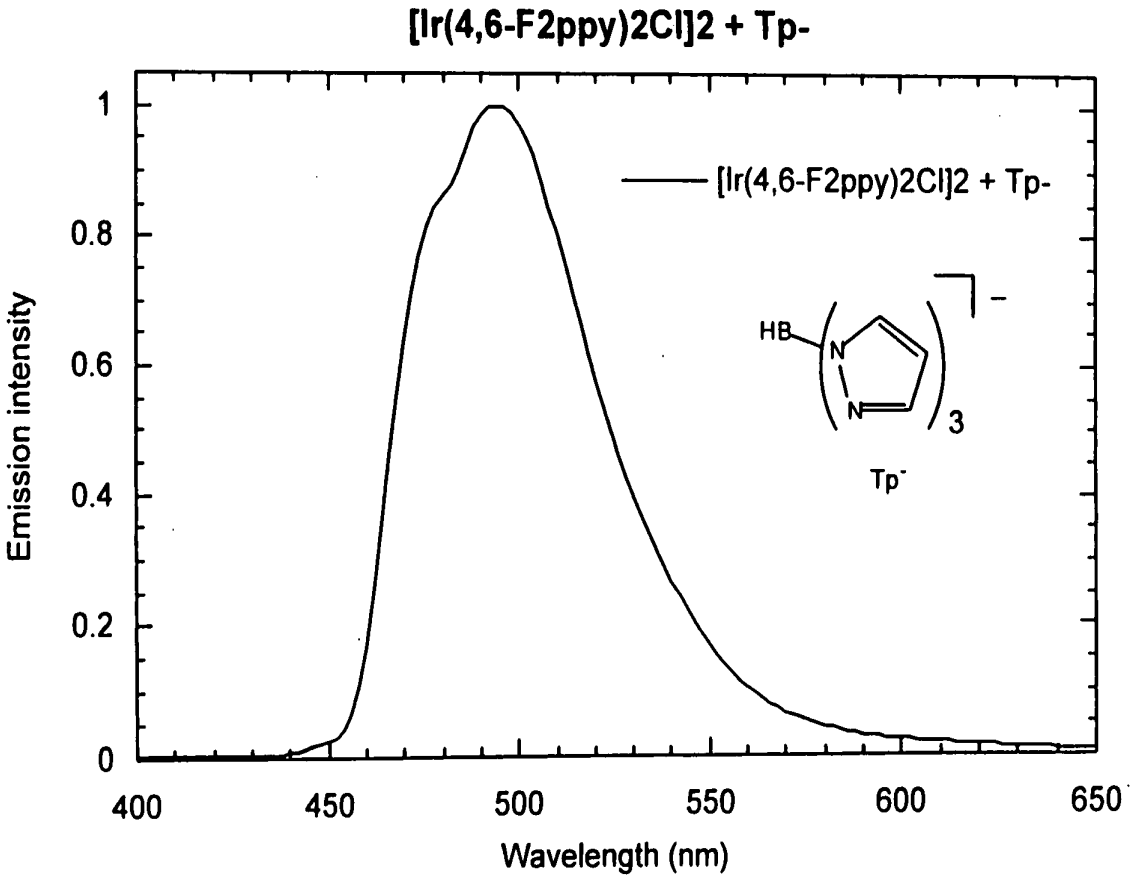


Figure 7m

Ir(4,6-F2ppy)2(acac) in CH2Cl2

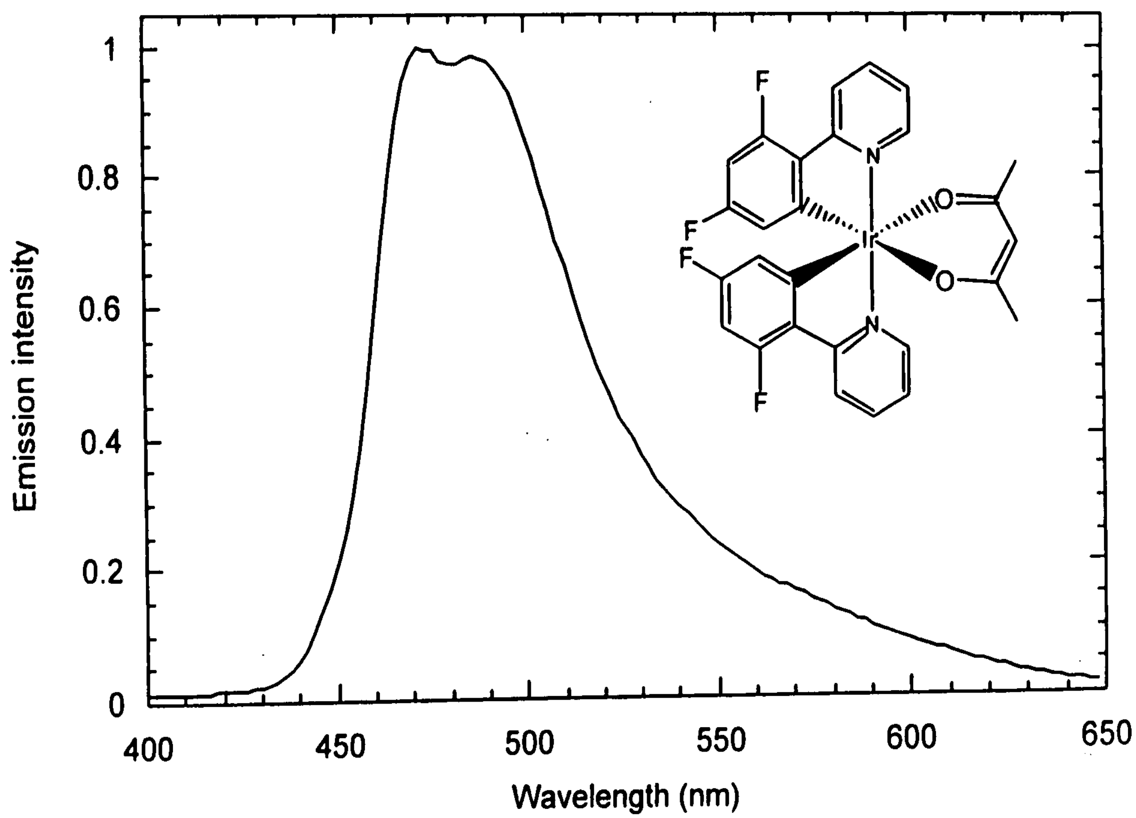


Figure 7n

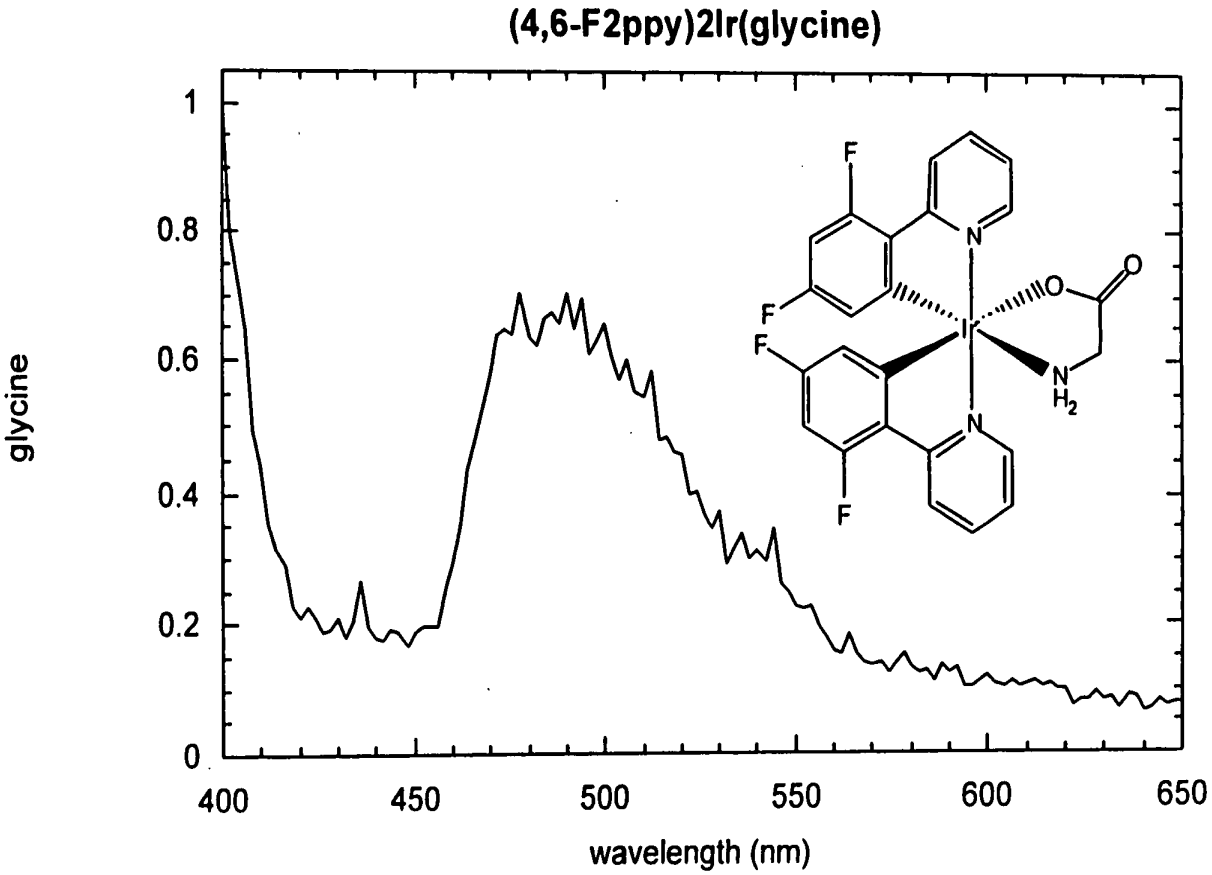


Figure 7o

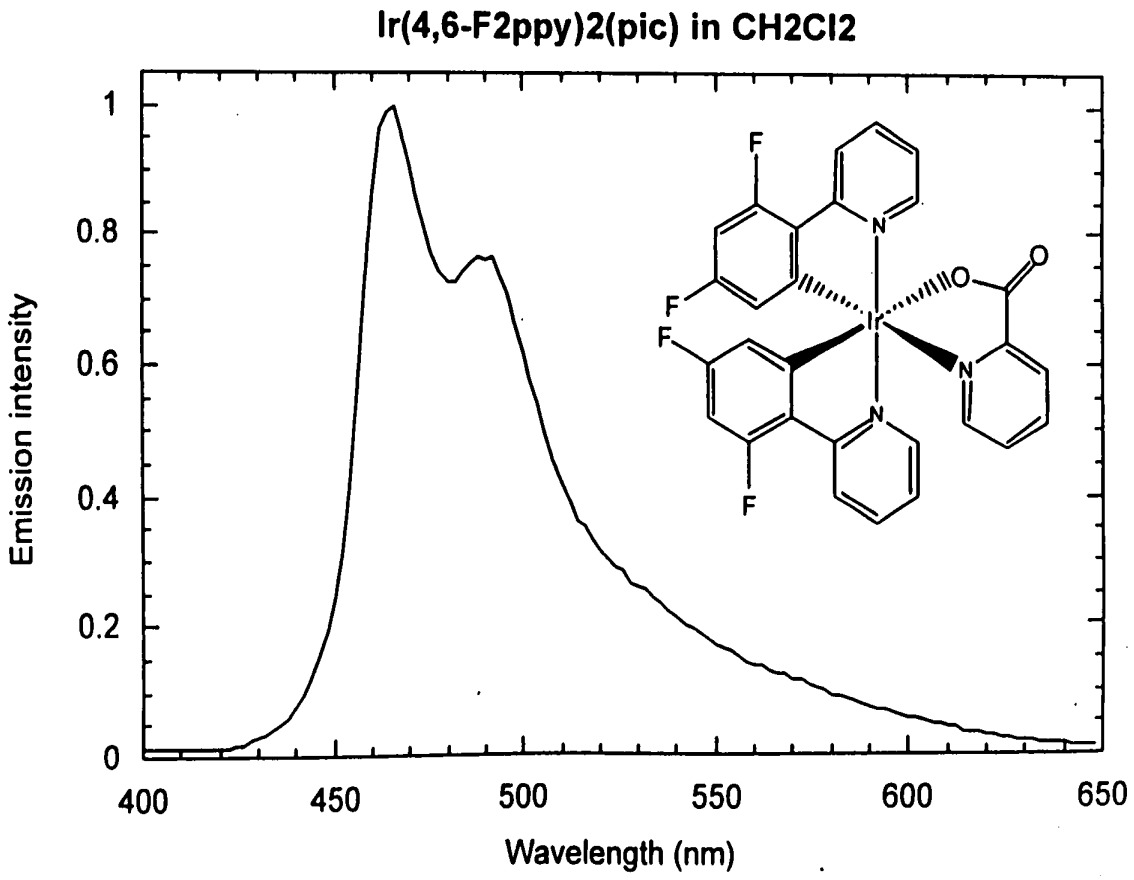

Ir(4,6-F2ppy)2(pic) in CH2Cl2
Emission intensity
Wavelength (nm)
0
0.2
0.4
0.6
0.8
1
400
450
500
550
600
650
F
F
F
F
N
N
N
O
O
Ir

Figure 7p

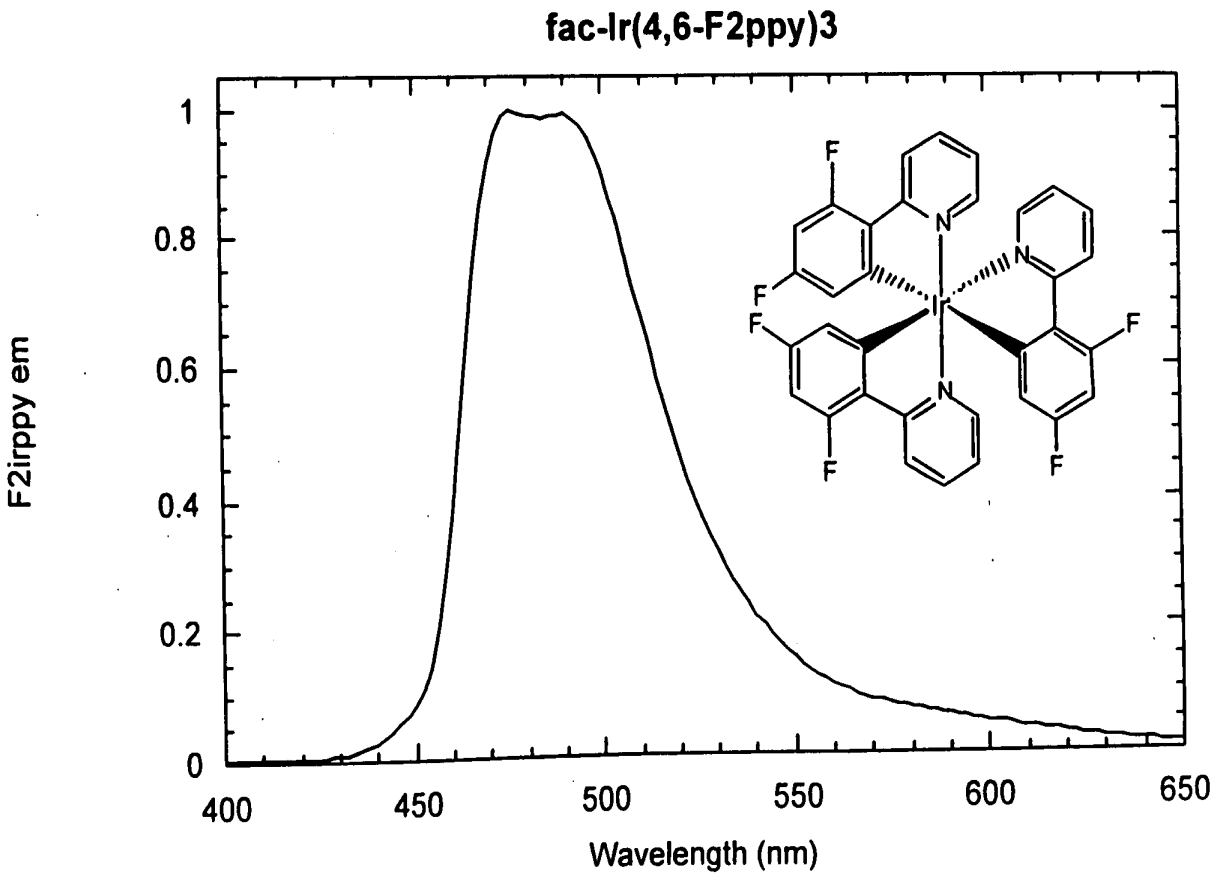

fac-Ir(4,6-F2ppy)3
F2irppy em
1
0.8
0.6
0.4
0.2
0
400
450
500
550
600
650
Wavelength (nm)
F
N
Ir

Figure 7g

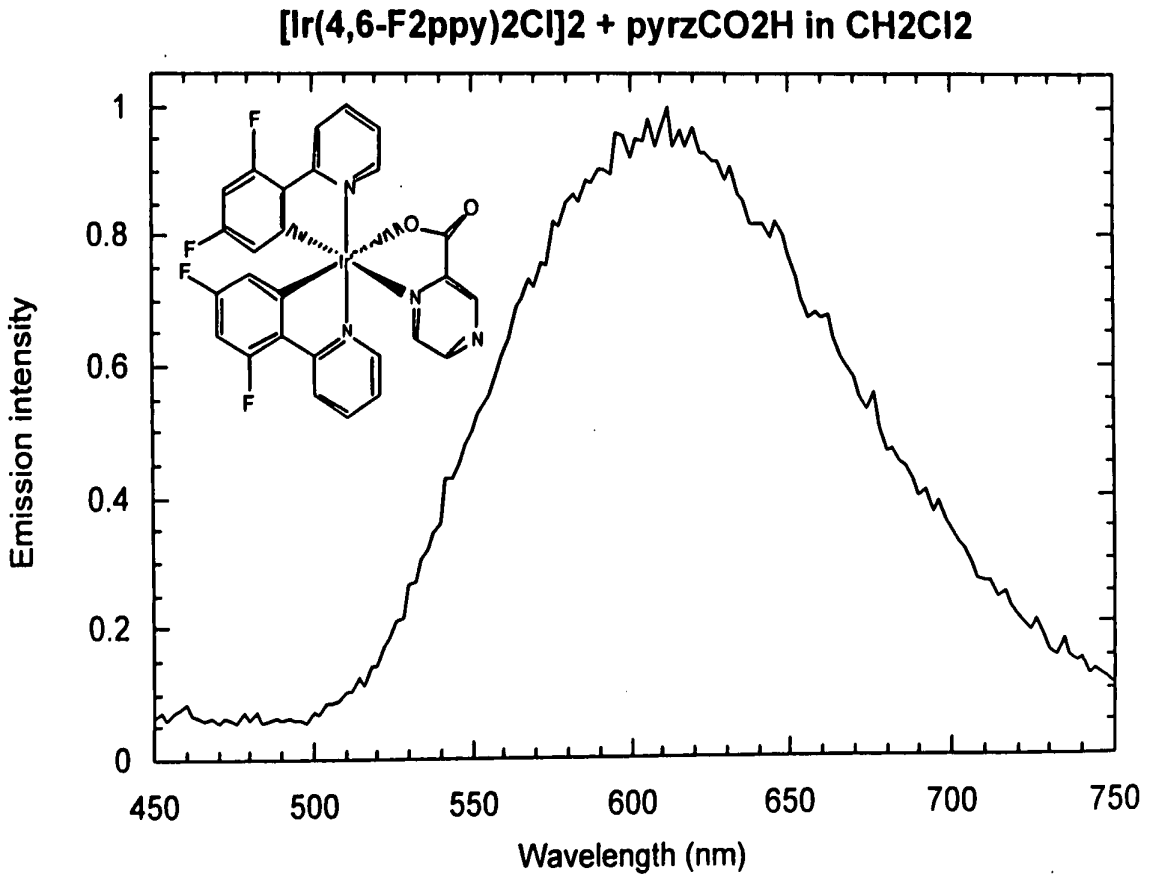


Figure 7r

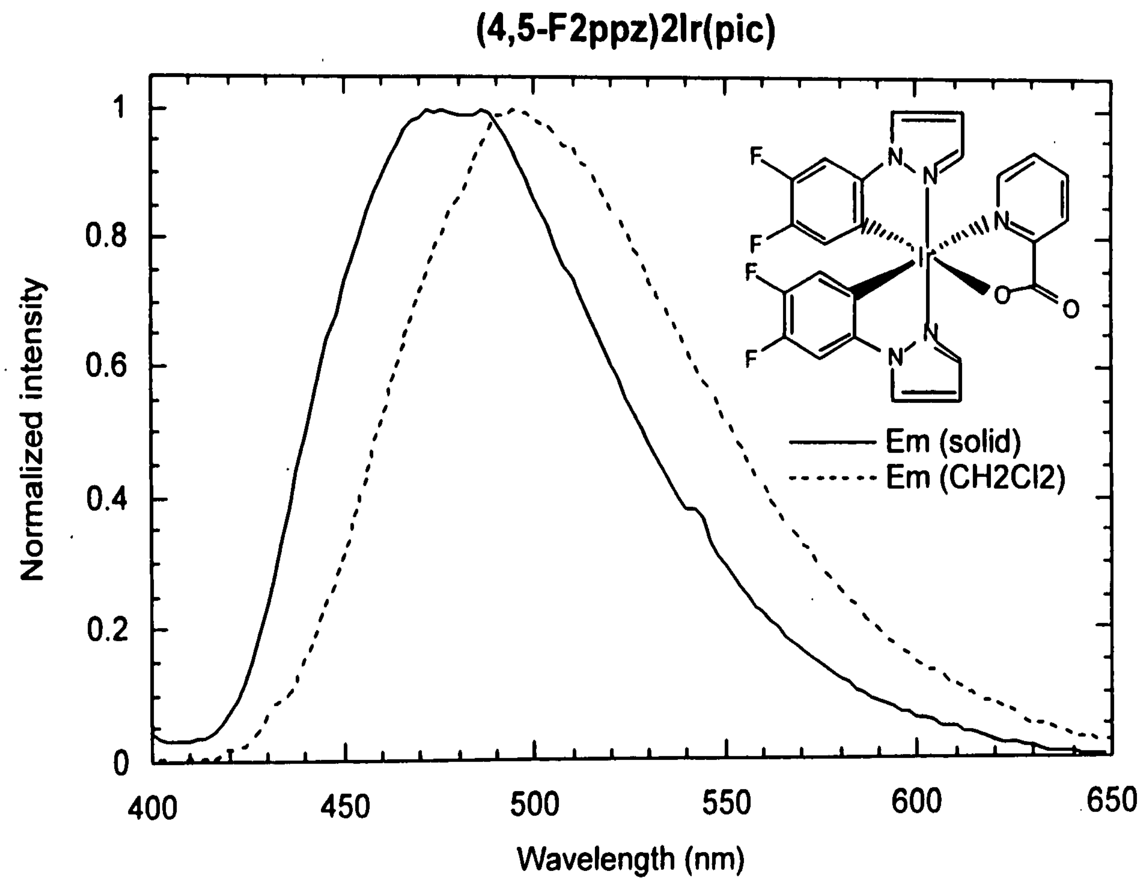
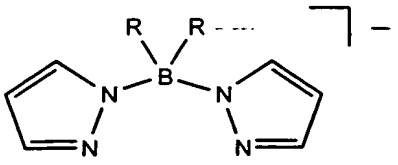
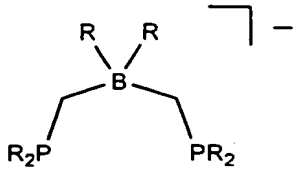
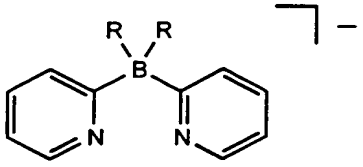
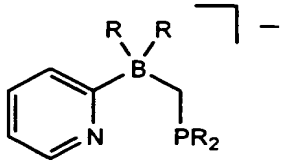

(4,5-F2ppz)2Ir(pic)
Normalized intensity
Wavelength (nm)
Em (solid)
Em (CH2Cl2)
0
0.2
0.4
0.6
0.8
1
400
450
500
550
600
650

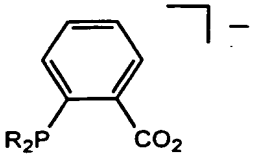
Figure 8a

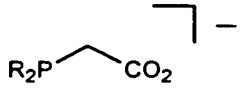


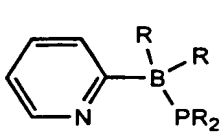


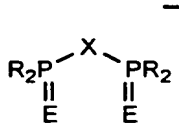












X=CH, N
E=O,S,Se,Te

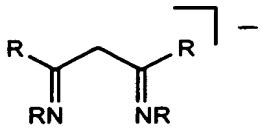
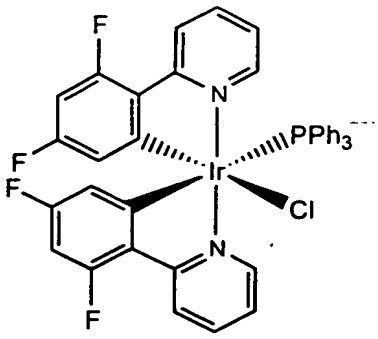
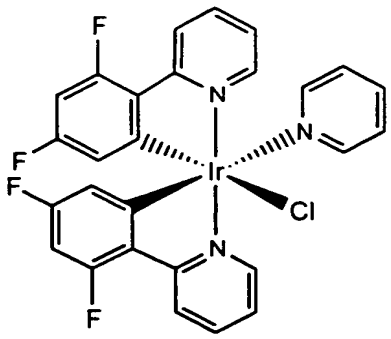
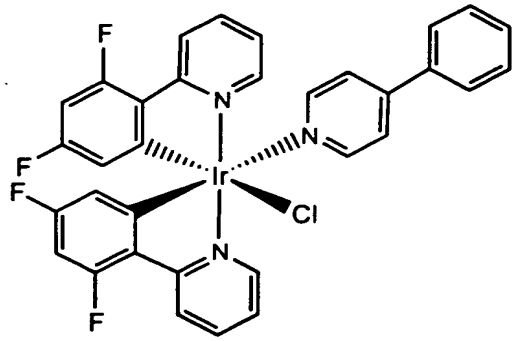
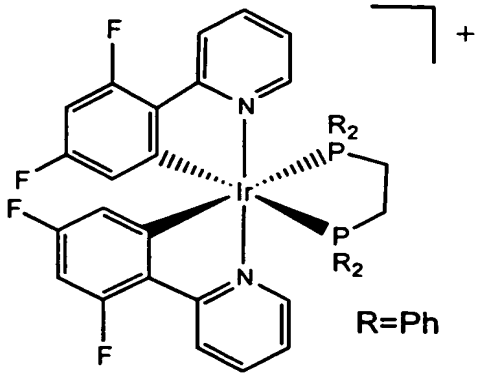


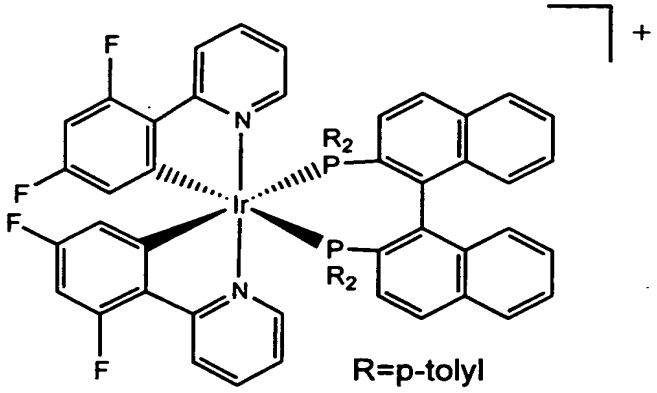
Figure 8b

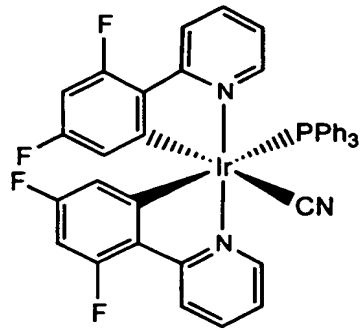


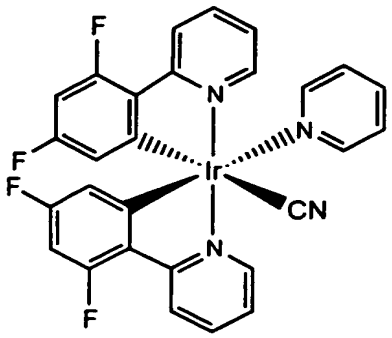












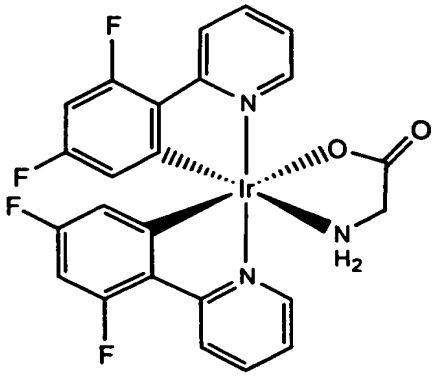
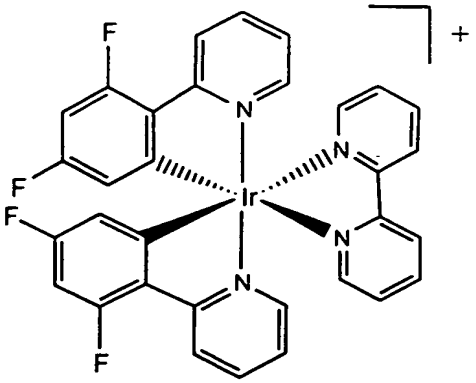
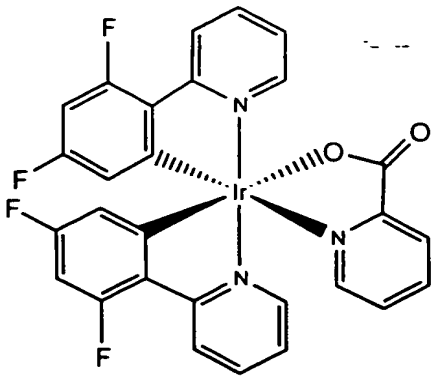
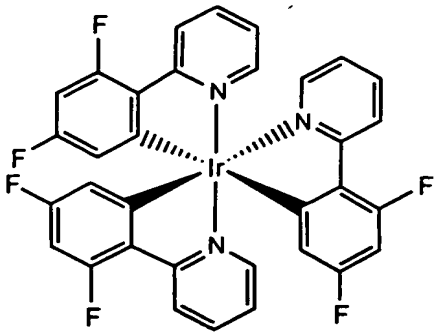
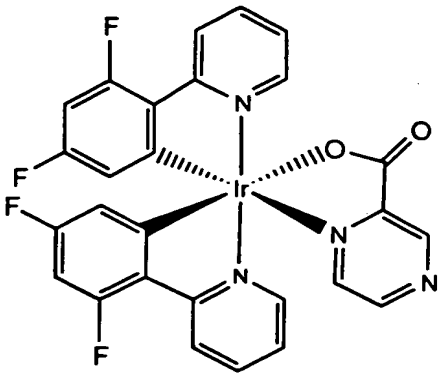


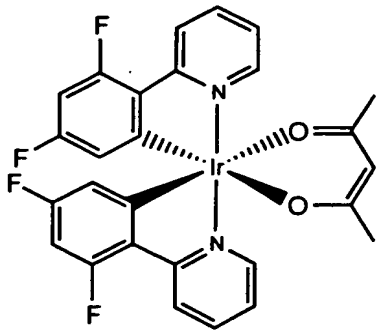
Figure 8c

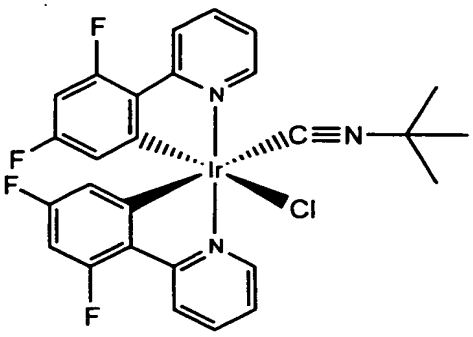












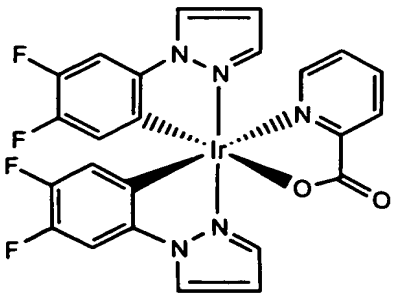
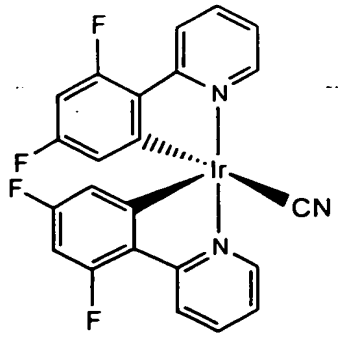
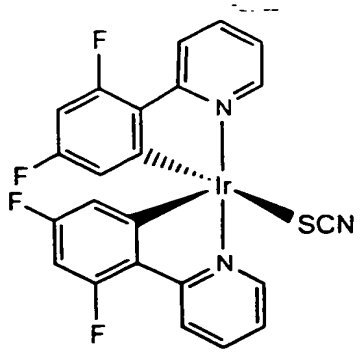
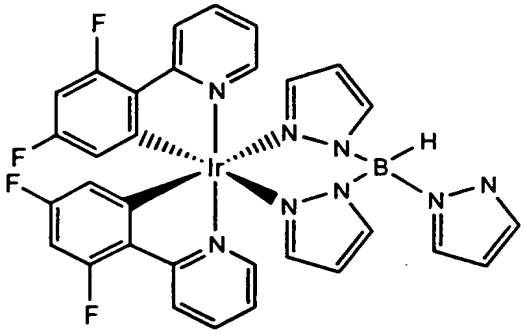
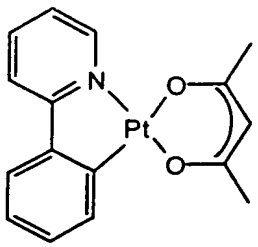


Figure 8d



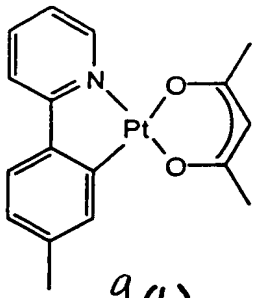






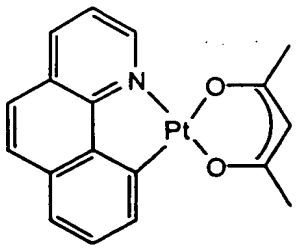
9(a)

(ppy)Pt(acac)



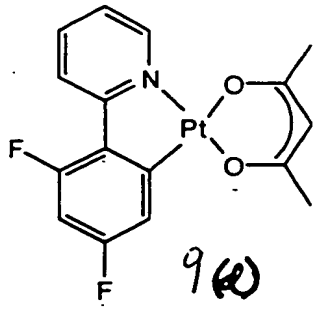
9(b)

(tpy)Pt(acac)



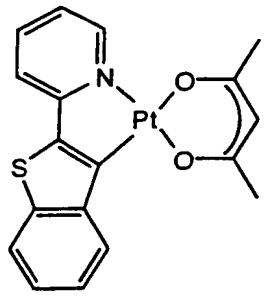
9(c)

(bzq)Pt(acac)



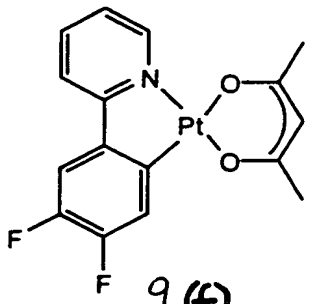
9(d)

(4,6-F_2ppy)Pt(acac)



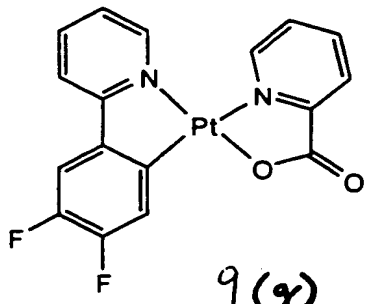
9(e)

(btp)Pt(acac)



9(f)

(4,5-F_2ppy)Pt(acac)



9(g)

(4,5-F_2ppy)Pt(pico)

Figures 9(a) - 9(g)

Figure 10: This Emission spectrum shows the spectra of both $Pt(ppy)_2$ and $Pt(ppy)_2Br_2$. The former gives green emission, partly form MLCT transitions, and the latter gives blue emission, predominantly from a triplet π-π^* transition. The structure observed for the $Pt(ppy)_2Br_2$ spectrum is consistent with ligand centered emission. The luminescent lifetimes for the two complexes are 4 and 150 μsec.

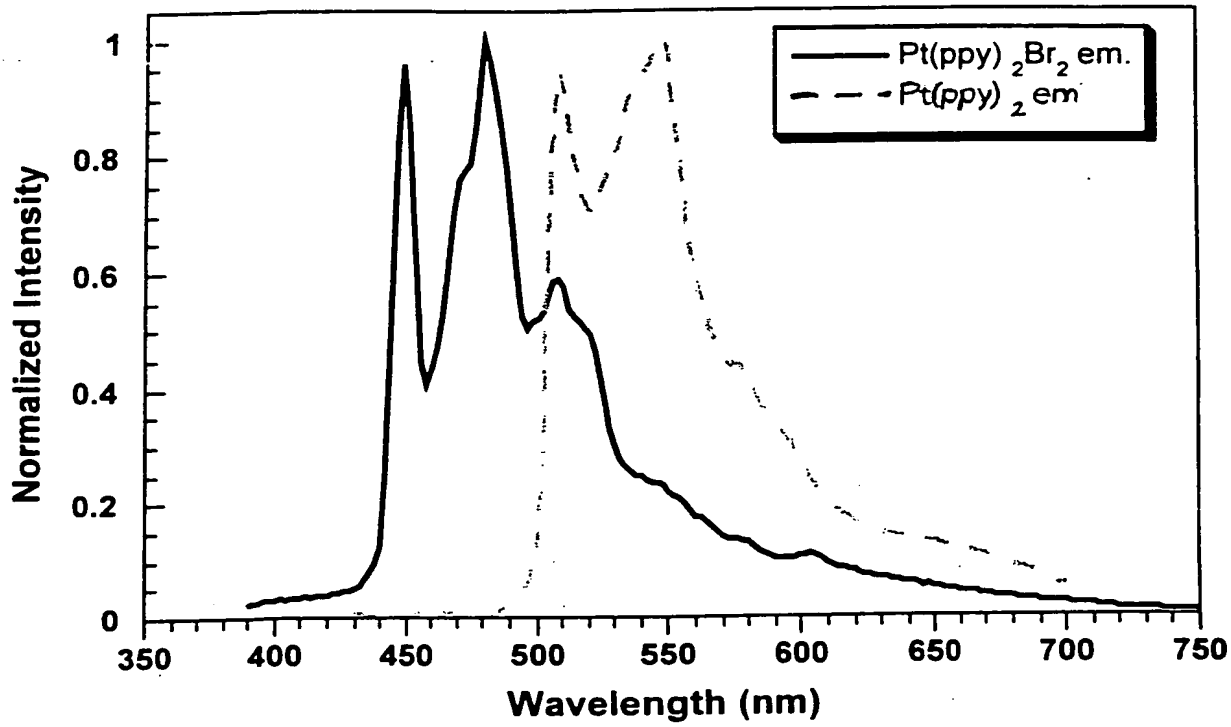


Figure 10

Figure 11: This plot shows the emission spectra of (ppy)$AuCl_2$ and (ppy)A 2,2'-biphenylene). Both emit from ligand triplet π-π^* transitions.

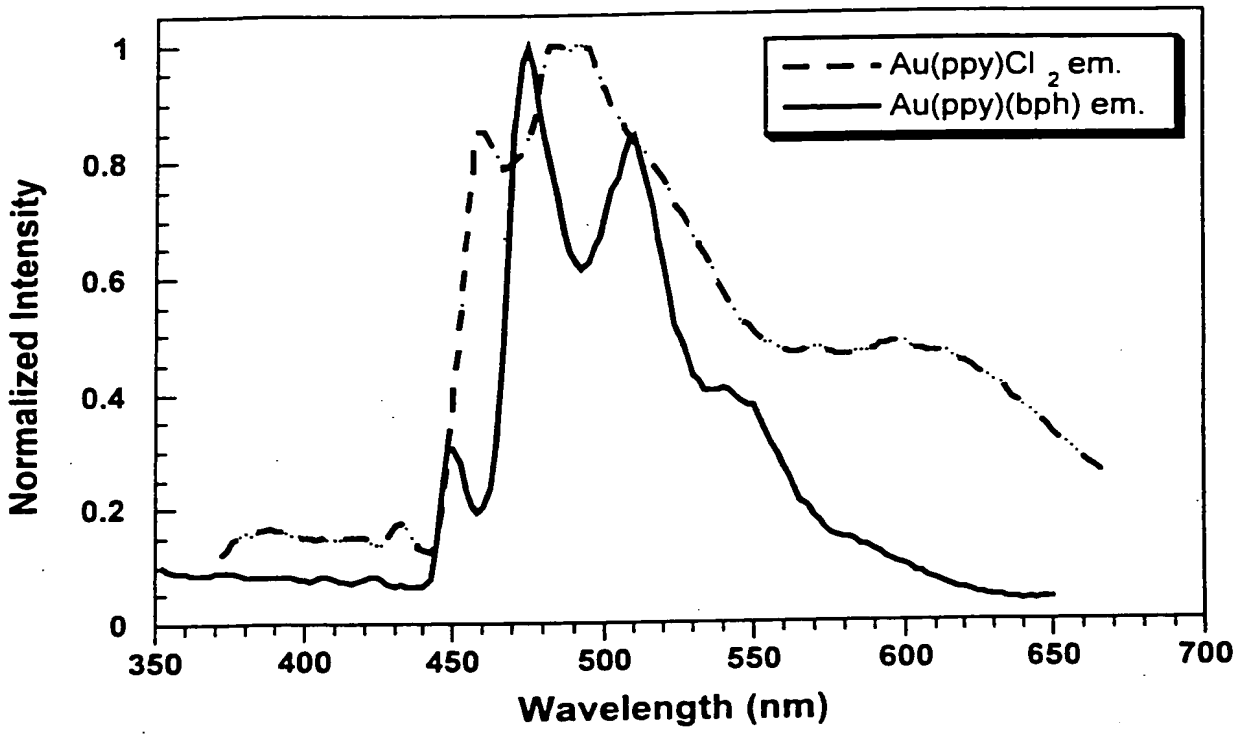


Figure 11

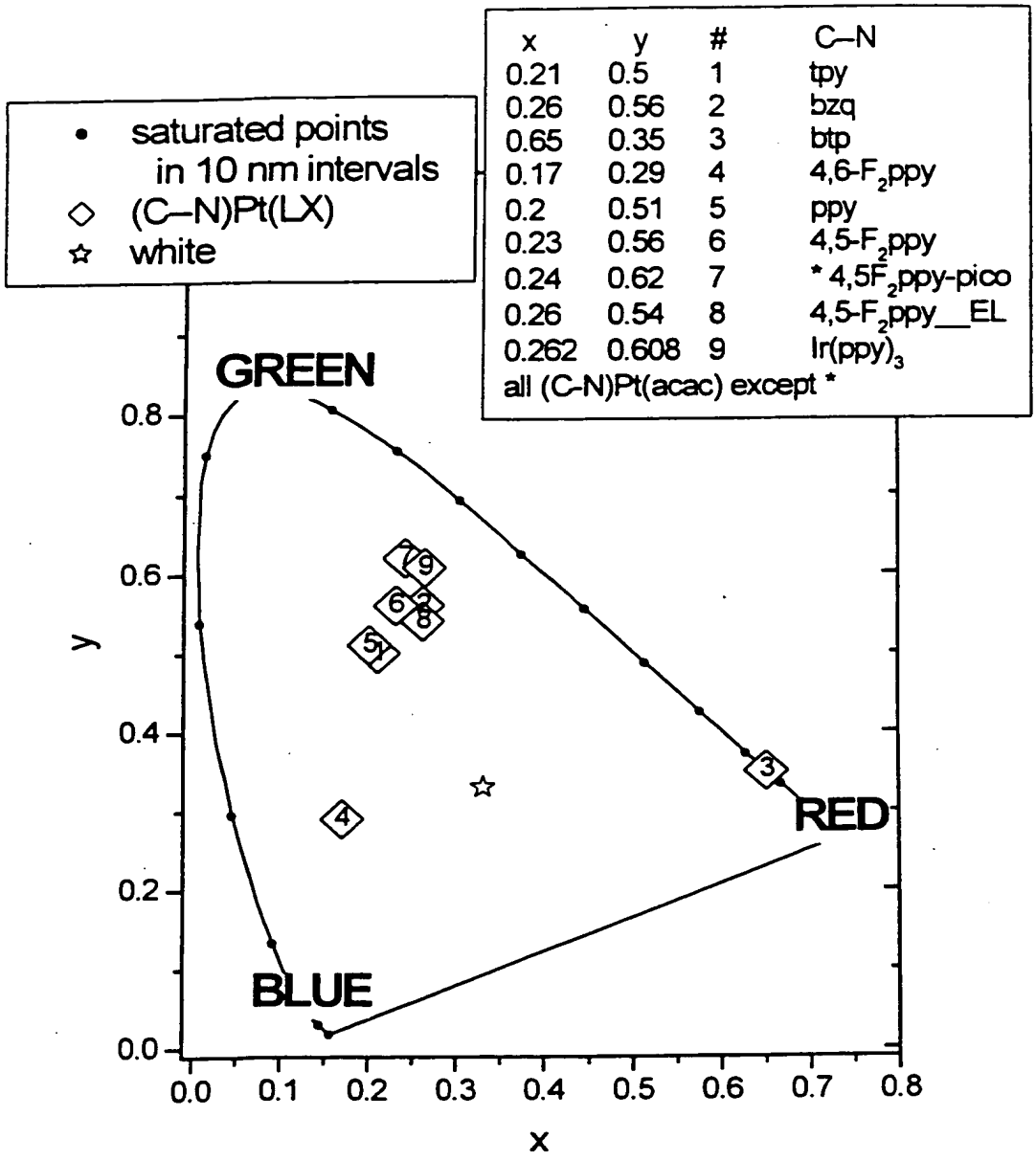

• saturated points in 10 nm intervals
◇ (C–N)Pt(LX)
☆ white
x y # C–N
0.21 0.5 1 tpy
0.26 0.56 2 bzq
0.65 0.35 3 btp
0.17 0.29 4 4,6-F2ppy
0.2 0.51 5 ppy
0.23 0.56 6 4,5-F2ppy
0.24 0.62 7 * 4,5F2ppy-pico
0.26 0.54 8 4,5-F2ppy__EL
0.262 0.608 9 Ir(ppy)3
all (C-N)Pt(acac) except *
GREEN
RED
BLUE
y
x
0.0
0.2
0.4
0.6
0.8
0.1
0.3
0.5
0.7

Figure 12

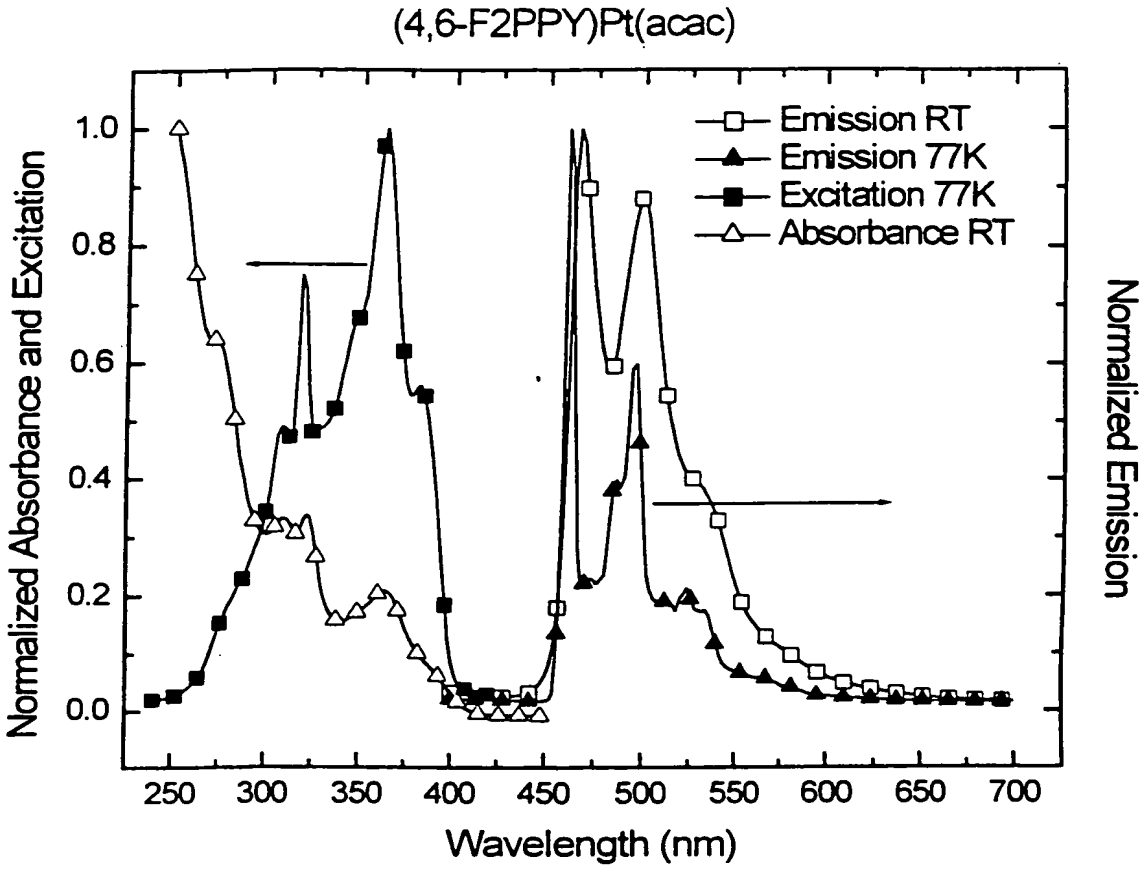

(4,6-F2PPY)Pt(acac)
Emission RT
Emission 77K
Excitation 77K
Absorbance RT
Normalized Absorbance and Excitation
Normalized Emission
Wavelength (nm)
0.0
0.2
0.4
0.6
0.8
1.0
250
300
350
400
450
500
550
600
650
700

Figure 13

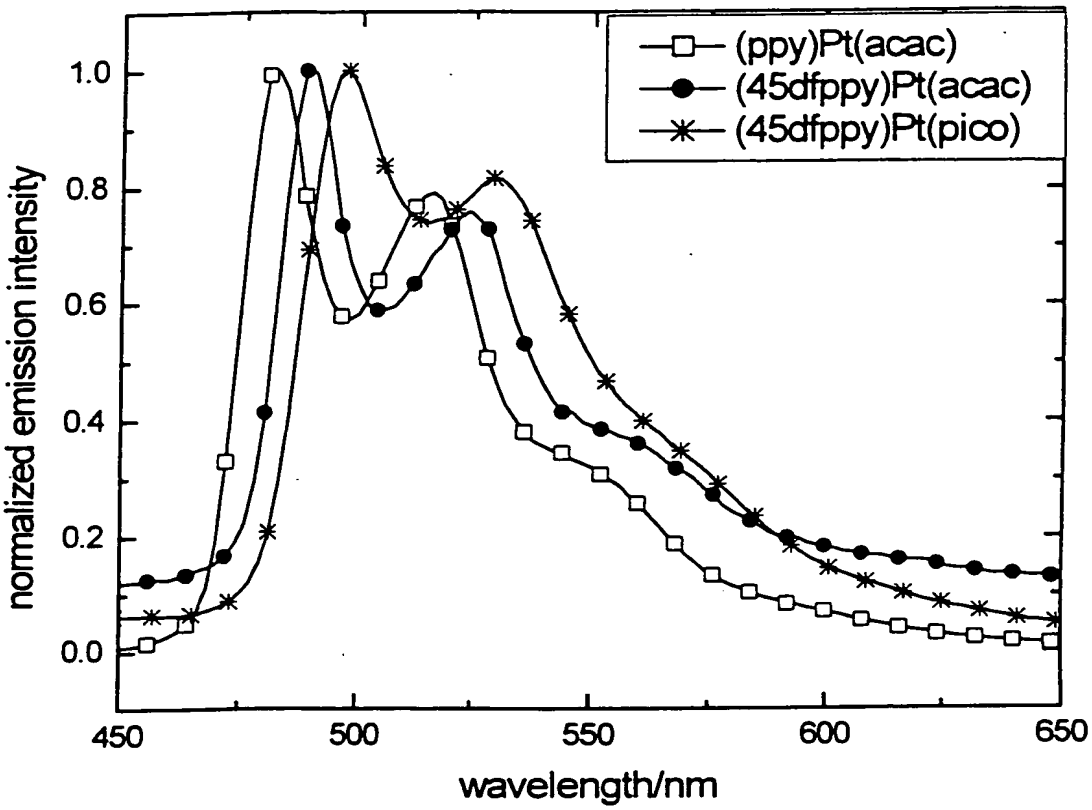

(ppy)Pt(acac)
(45dfppy)Pt(acac)
(45dfppy)Pt(pico)
normalized emission intensity
1.0
0.8
0.6
0.4
0.2
0.0
450
500
550
600
650
wavelength/nm

Figure 14

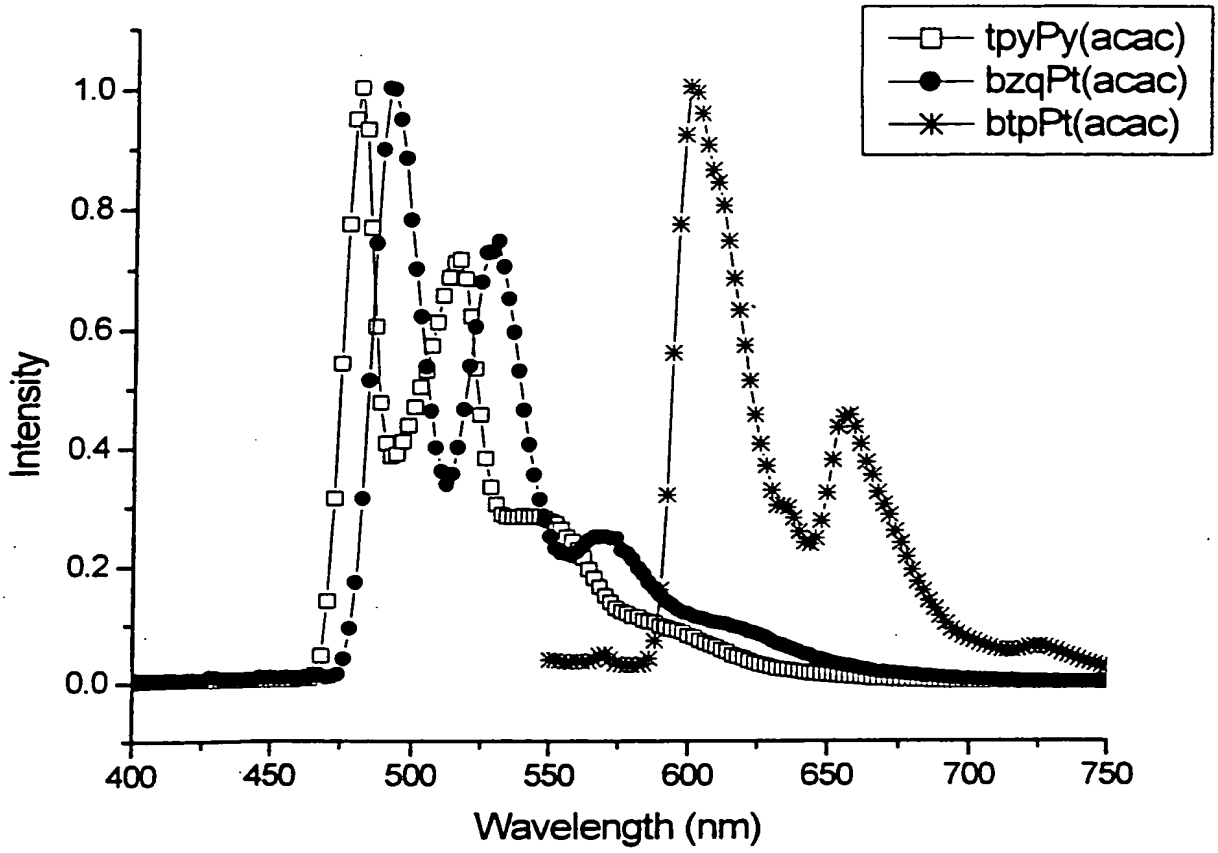

tpyPy(acac)
bzqPt(acac)
btpPt(acac)
Intensity
1.0
0.8
0.6
0.4
0.2
0.0
400
450
500
550
600
650
700
750
Wavelength (nm)

Figure 15

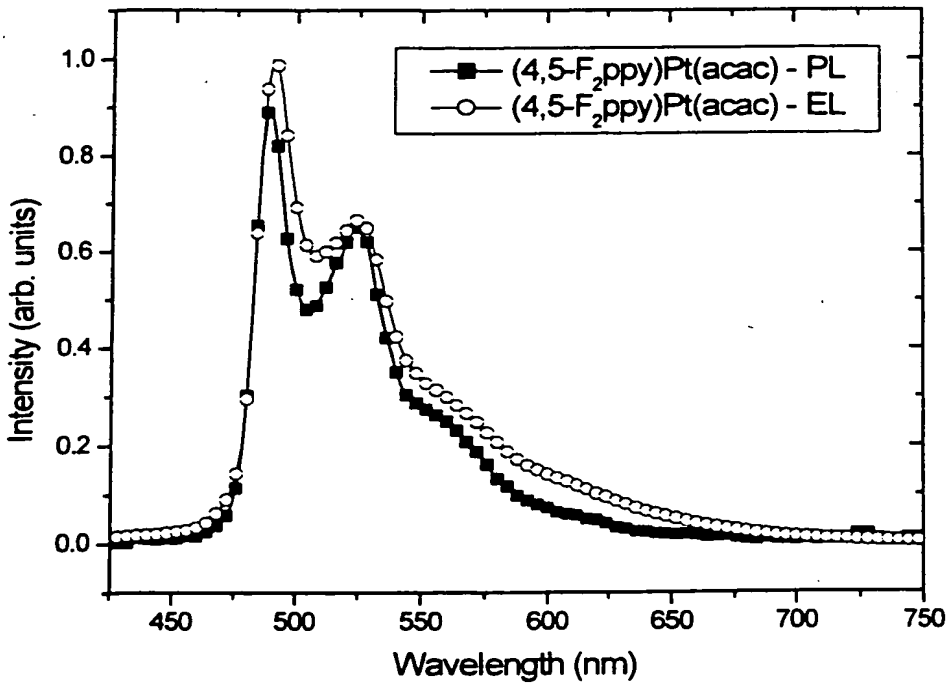


Figure 16

FIG. 17

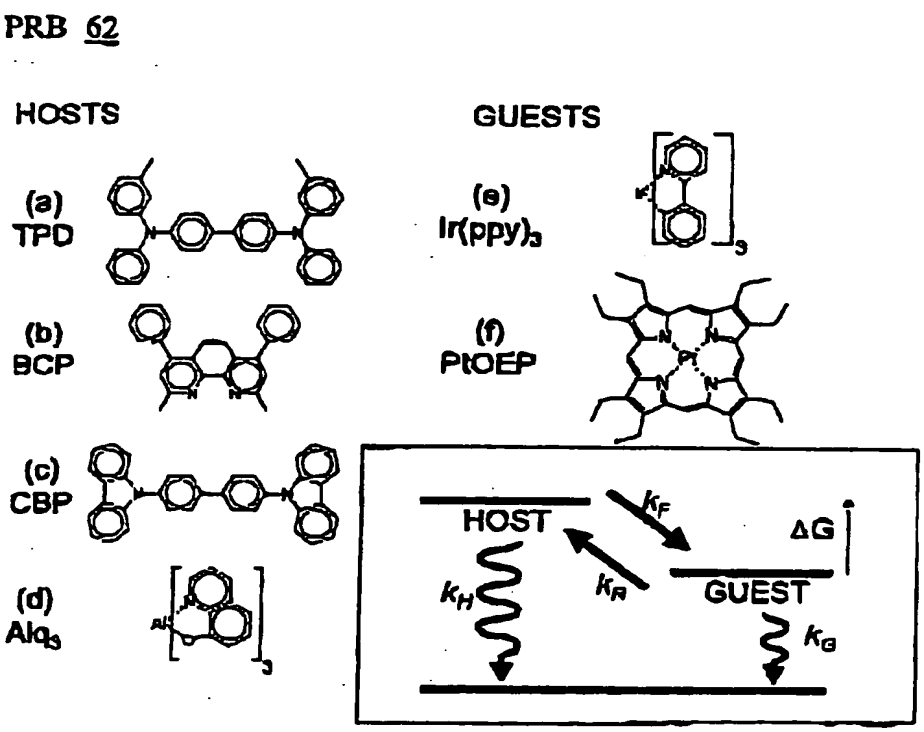

PRB 62
HOSTS
GUESTS
(a) TPD
(b) BCP
(c) CBP
(d) Alq3
(e) Ir(ppy)3
(f) PtOEP
HOST
GUEST
ΔG
kF
kR
kH
kG

FIG. 18

PRB 62

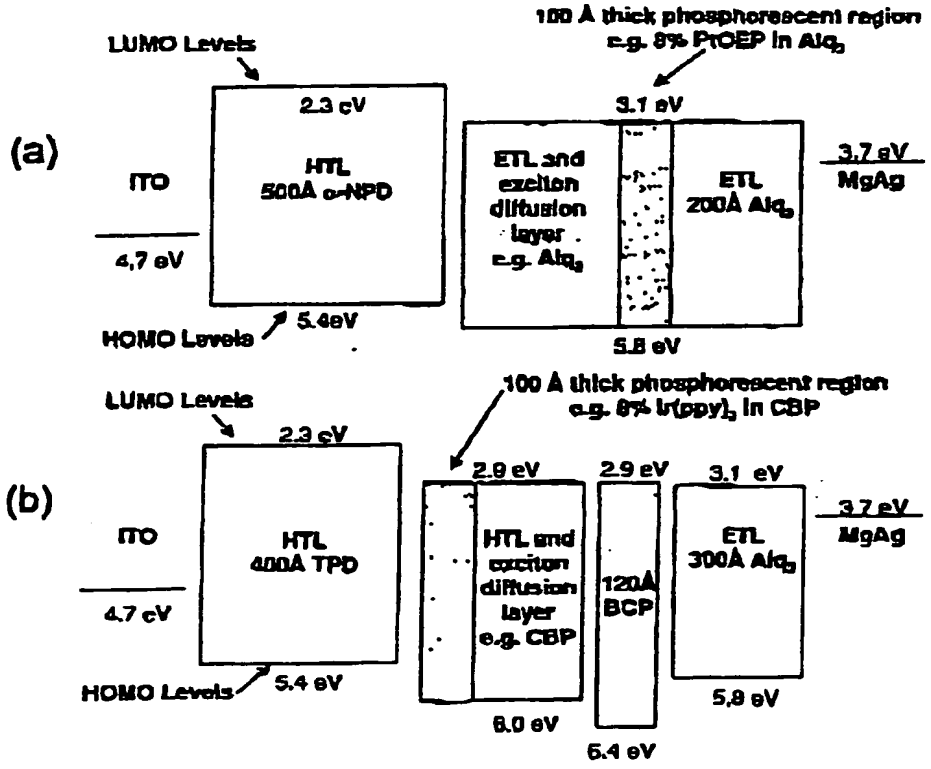

(a)
LUMO Levels
2.3 eV
ITO
4.7 eV
HTL
500Å α-NPD
HOMO Levels
5.4eV
100 Å thick phosphorescent region
e.g. 8% PtOEP in Alq3
3.1 eV
ETL and exciton diffusion layer e.g. Alq3
ETL
200Å Alq3
5.8 eV
3.7 eV
MgAg
(b)
LUMO Levels
2.3 eV
ITO
4.7 eV
HTL
400Å TPD
HOMO Levels
5.4 eV
100 Å thick phosphorescent region
e.g. 8% Ir(ppy)3 in CBP
2.9 eV
HTL and exciton diffusion layer e.g. CBP
6.0 eV
2.9 eV
120Å BCP
6.4 eV
3.1 eV
ETL
300Å Alq3
5.9 eV
3.7 eV
MgAg

FIG. 19

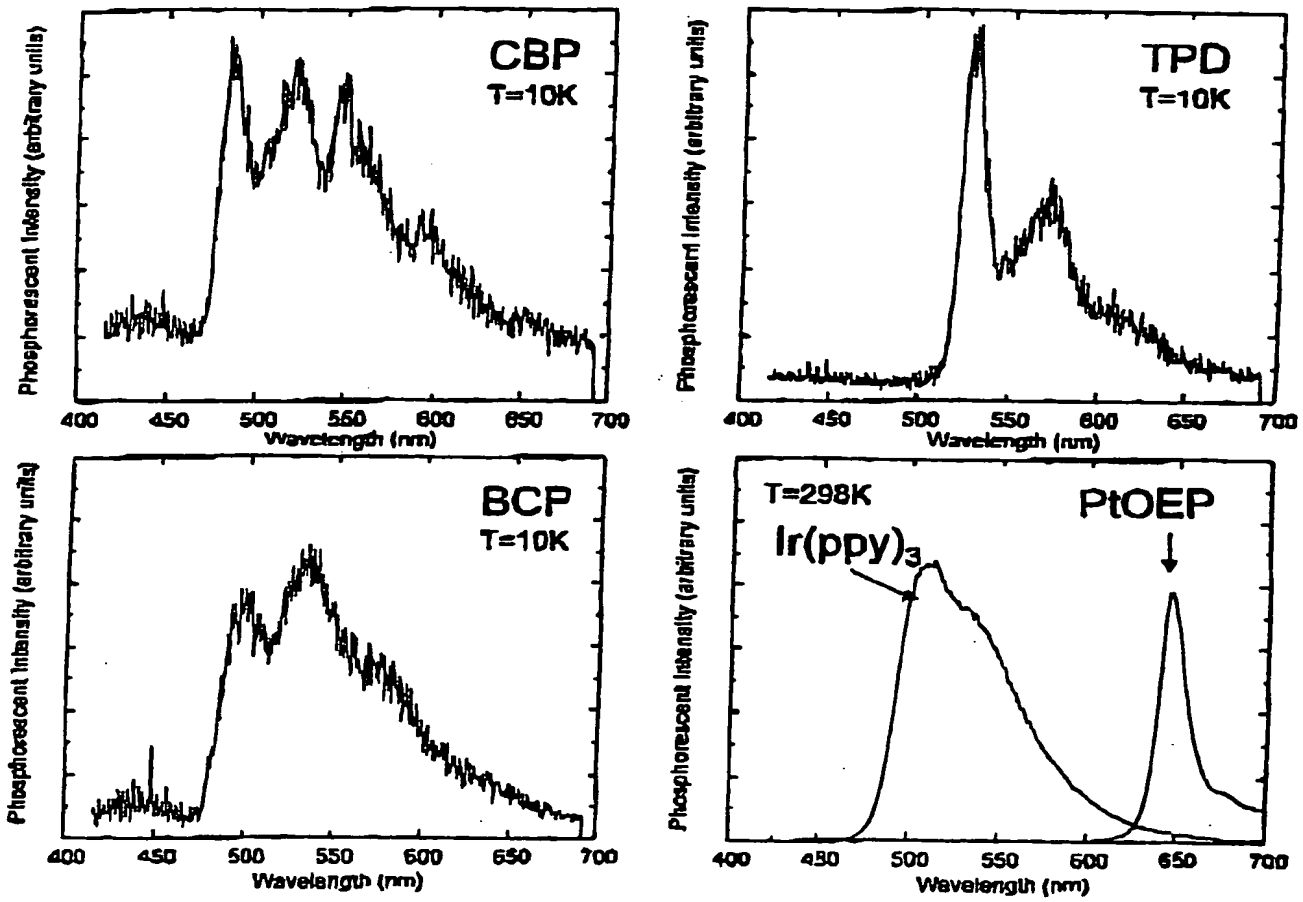

CBP
T=10K
TPD
T=10K
BCP
T=10K
T=298K
Ir(ppy)3
PtOEP
Phosphorescent Intensity (arbitrary units)
Wavelength (nm)
400
450
500
550
600
650
700

FIG. 20

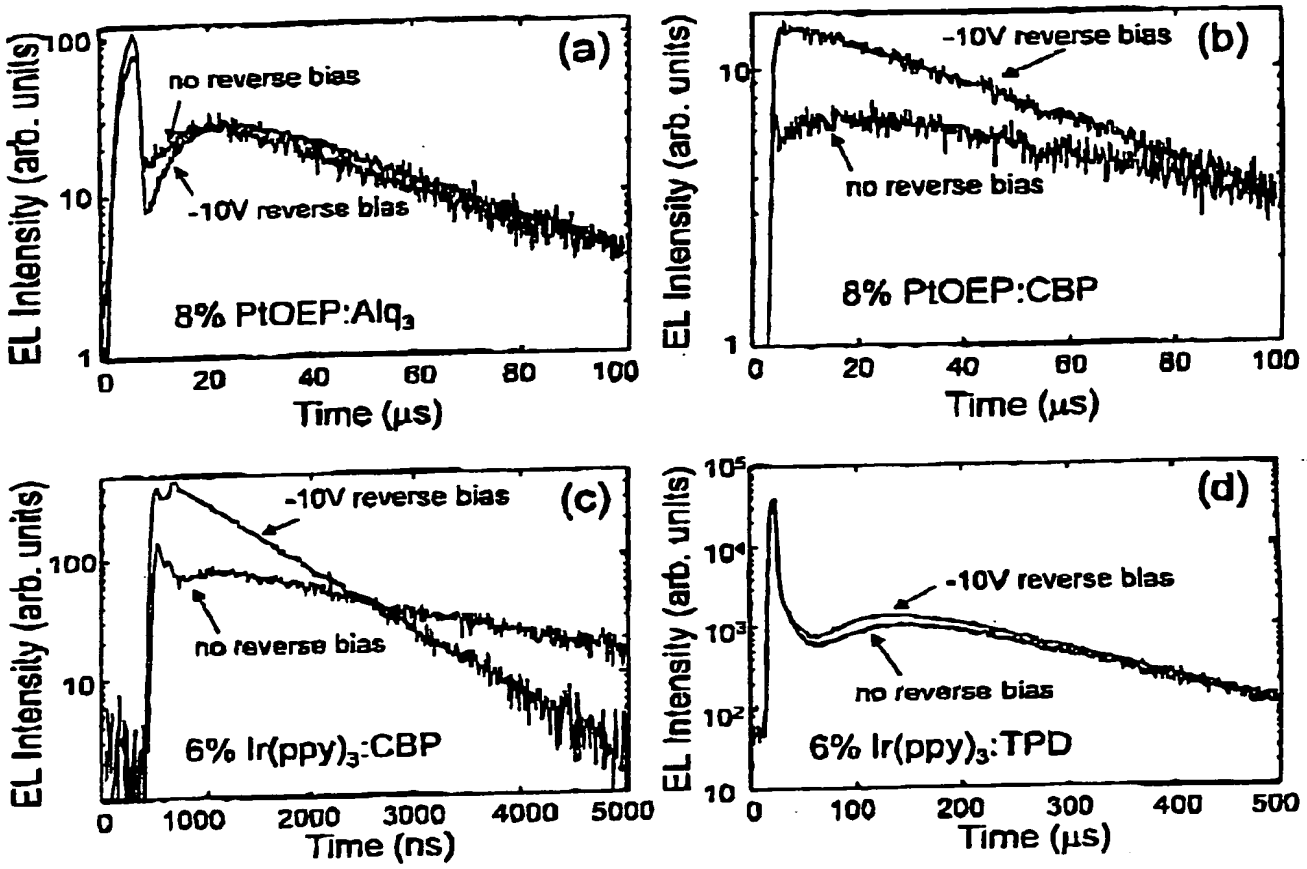

EL Intensity (arb. units)
100
10
1
(a)
no reverse bias
-10V reverse bias
8% PtOEP:Alq3
0
20
40
60
80
100
Time (μs)
EL Intensity (arb. units)
10
1
-10V reverse bias
(b)
no reverse bias
8% PtOEP:CBP
0
20
40
60
80
100
Time (μs)
EL Intensity (arb. units)
100
10
-10V reverse bias
(c)
no reverse bias
6% Ir(ppy)3:CBP
0
1000
2000
3000
4000
5000
Time (ns)
EL Intensity (arb. units)
10^5
10^4
10^3
10^2
10
(d)
-10V reverse bias
no reverse bias
6% Ir(ppy)3:TPD
0
100
200
300
400
500
Time (μs)

FIG. 21

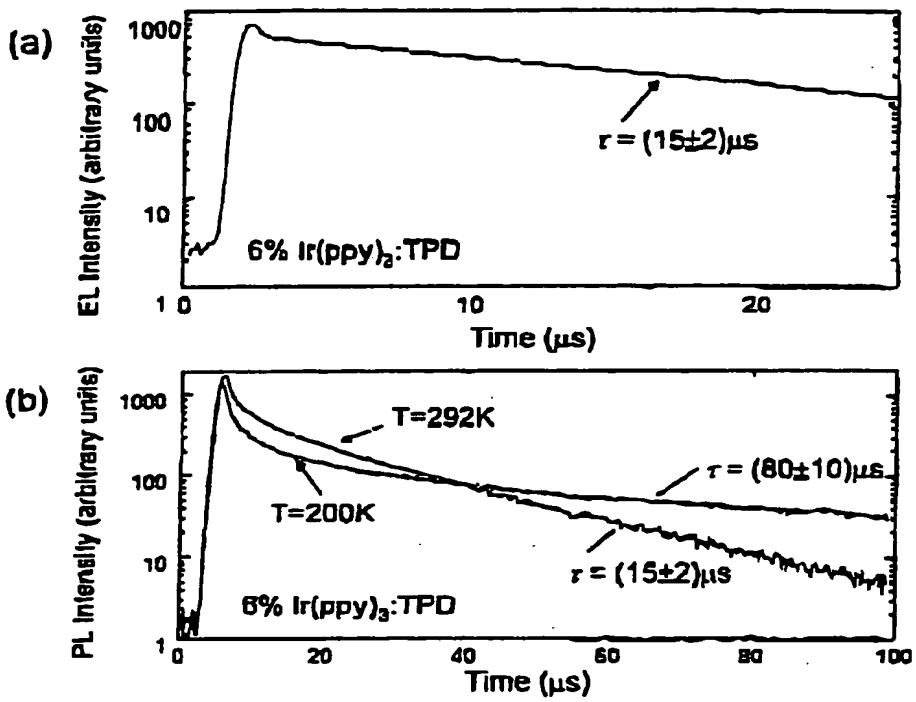

(a)
EL Intensity (arbitrary units)
1000
100
10
1
0
10
20
Time (μs)
τ = (15±2)μs
6% Ir(ppy)2:TPD
(b)
PL Intensity (arbitrary units)
1000
100
10
1
0
20
40
60
80
100
Time (μs)
T=292K
T=200K
τ = (80±10)μs
τ = (15±2)μs
6% Ir(ppy)3:TPD

FIG. 22

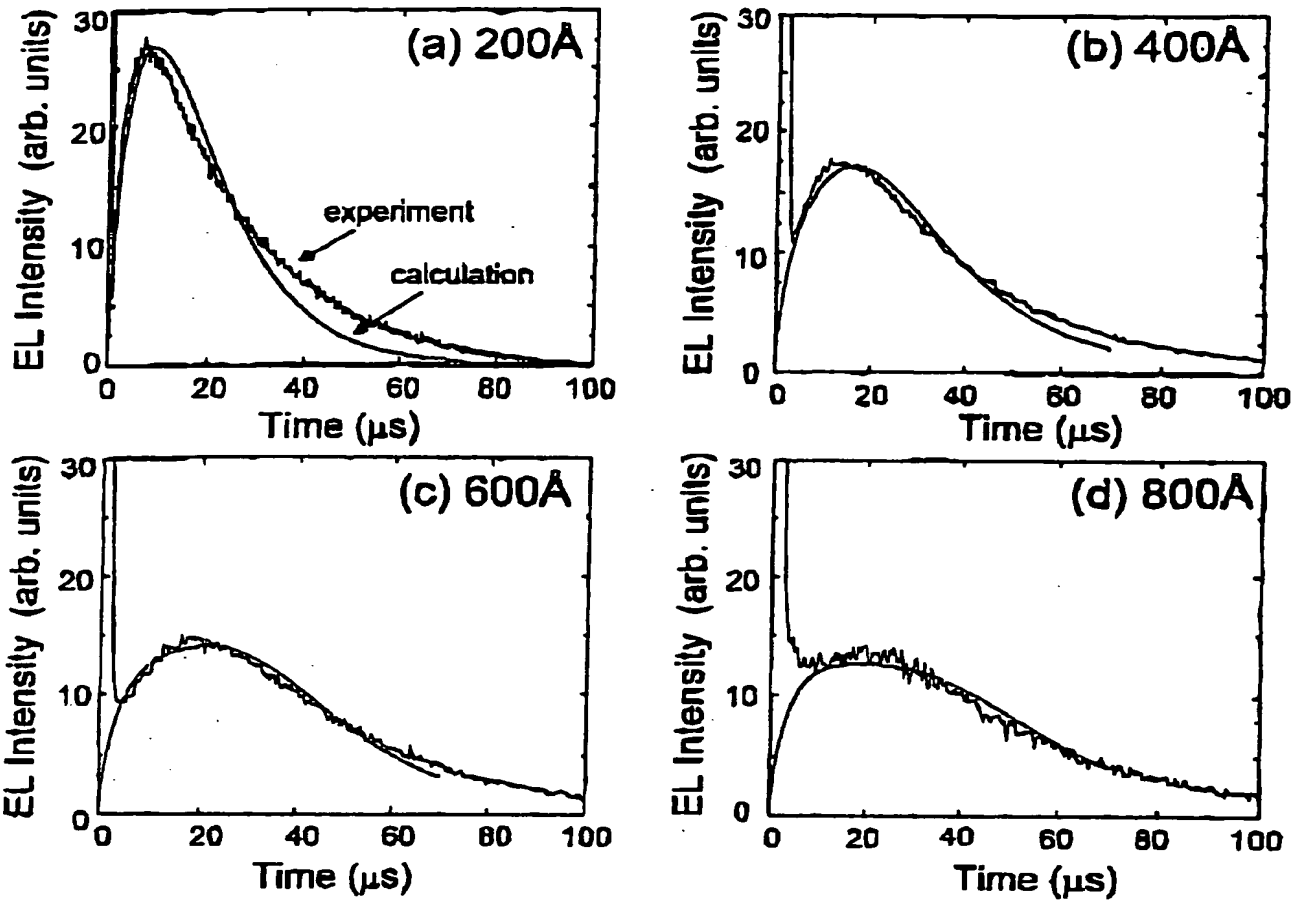
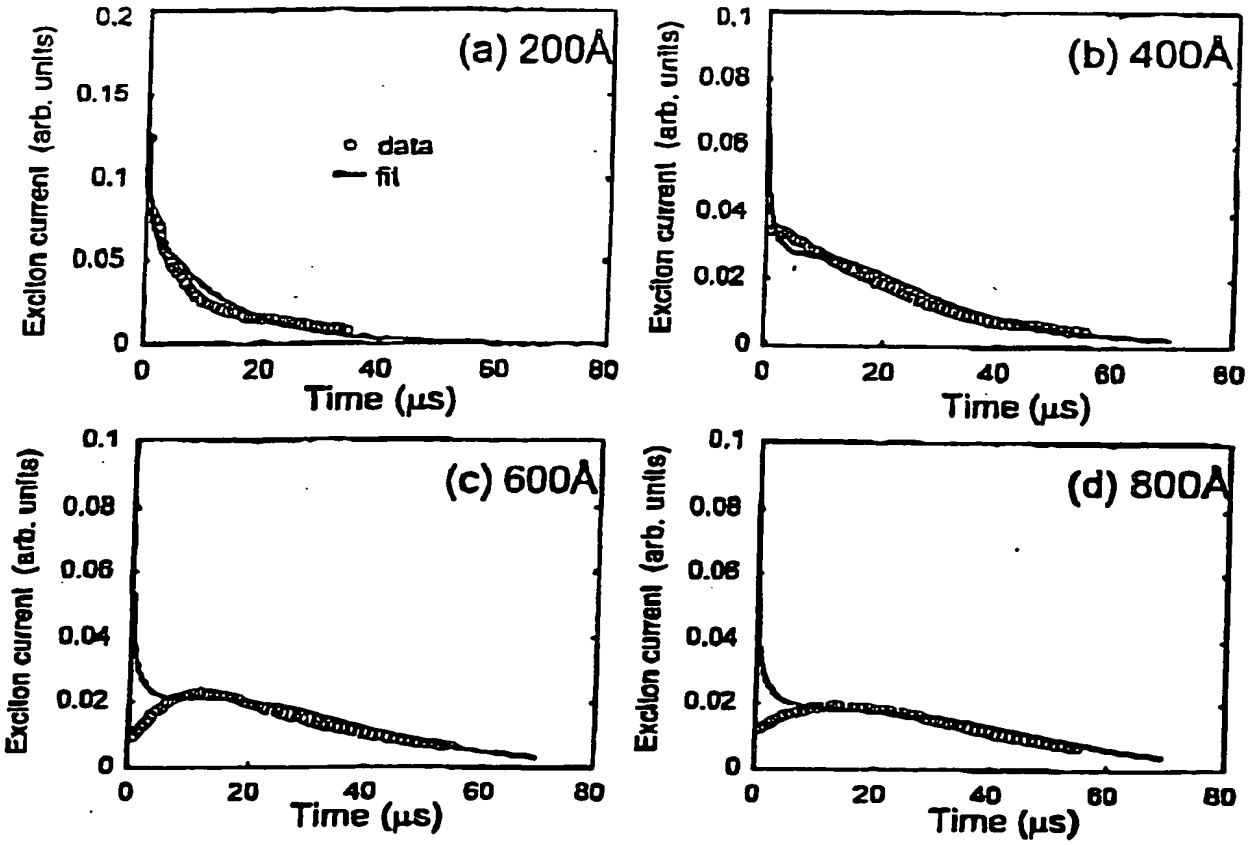

(a) 200Å
experiment
calculation
EL Intensity (arb. units)
Time (μs)
(b) 400Å
EL Intensity (arb. units)
Time (μs)
(c) 600Å
EL Intensity (arb. units)
Time (μs)
(d) 800Å
EL Intensity (arb. units)
Time (μs)

Fig. 23


(a) 200Å
(b) 400Å
(c) 600Å
(d) 800Å
data
fit
Exciton current (arb. units)
Time (μs)
0
20
40
60
80
0.05
0.1
0.15
0.2
0.02
0.04
0.06
0.08